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FRANKS TRACT STATE RECREATION AREA WETLANDS HABITAT RESTORATION

EXECUTIVE SUMMARY

a. Project Title and Applicant Name

Project Title: Franks Tract State Recreation Area Wetlands Habitat Restoration

Co-Applicants: Moffatt & Nichol Engineers (MNE)
California Department of Parks and Recreation (DPR)
California Department of Water Resources (DWR)

- b. Project Description and Primary Biological/Ecological Objectives** - Franks Tract State Recreation Area ("SRA"), located in Contra Costa County, consists of two flooded Delta tracts totaling approximately 3300 acres owned by the State of California and operated by the DPR. In 1990, DPR contracted with MNE to prepare an engineering Feasibility Study of constructing a number of islands to bolster the fish and wildlife resources of the SRA, serve as effective wave barriers to help protect the levees of neighboring islands, and expand the SRA's land base for recreational uses, in accordance with the goals of the General Plan for the SRA. The MNE study identified numerous opportunities for island construction, and demonstrated the feasibility of obtaining and placing material to form islands that would meet the General Plan goals. Due to DPR funding constraints, the study recommended limited construction of demonstration islands along Piper Slough; the islands were never constructed for lack of funding.

The Co-Applicants intend to proceed with implementation of the recommendations in the MNE study pertaining to the demonstration islands that provide primary ecological benefits for the CALFED priority species by restoring 45 acres of the existing deeply flooded habitat to a combination of tidal perennial aquatic habitat, shaded riverine aquatic habitat, and mid channel islands and shoal habitat. The opportunity to extend the habitat restoration beyond 45 acres is available if additional funds are provided in this or subsequent funding cycles.

- c. Approach/Tasks/Schedule** - The proposed project consists of three phases. Phase I - Preconstruction includes completion of the CEQA/NEPA environmental review and permit process, and preparation of the Final Design and Construction Documents. Phase II - Construction includes construction and construction management. Phase III - Post construction includes monitoring to evaluate the success of the habitat restoration effort.

The proposed schedule allows 12 months for completion of Phase I; 18 months for Phase II, and 36 months for Phase III. The tangible benefits of the project to the

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priority species should become available within a relatively short 3 years after the start of Phase I.

- d. **Justification for Project and Funding by CALFED** - The project is justified because it directly accomplishes CALFED's restoration goals for priority habitat types and species in the Central Delta. The use of CALFED's funds is necessary because the DPR and DWR are otherwise unable to fund the project, which has been in the works since 1989.
- e. **Budget Costs and Third Party Impacts** - The budget request for the project is as follows; Phase I \$231,500; Phase II \$4,268,100, and Phase III \$83,000. The total amount requested from CALFED is \$4,582,700. This amount can be provided in increments by Phase. If more funding than requested is available, the project can be expanded to include additional islands.

Some third party impacts have been identified. Neighboring Island Levees will benefit due to enhanced wave sheltering. SRA Recreationists will benefit due to ecosystem restoration. State Water Agencies will benefit due to reduced risk of levee breaks on neighboring islands.

- f. **Applicant Qualifications** - MNE is a California based firm with over 50 years specialized experience in Civil and Coastal Engineering. The firm has completed numerous large coastal wetlands restoration projects, as well as several Delta Wetlands projects. DPR and DWR are the State sponsors of the proposed project. The same team worked together on the planning and preliminary engineering for the project.
- g. **Monitoring and Data Evaluation** - During Phase II construction monitoring will assess the efficacy of the island construction materials and methods. During Phase III, monitoring of the habitat development will evaluate the overall success of the project. The results can be applied to showcase and help promote future habitat restoration projects.
- h. **Local Support/Coordination with other Programs/Compatibility with CALFED Objectives** - Local support, primarily due to wave suppression benefits for neighboring island levees, was apparent during the planning and preliminary engineering study. Public meetings at the time produced no opposition. State and Federal resource agencies were involved in the developing the proposed project. The habitat restoration goals of the project are based on the Resource Management Goals of DPR, which are consistent with CALFED's Category III Ecosystem Restoration Objectives, its mission, and its developing implementation strategy.

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TITLE PAGE

- a. Franks Tract State Recreation Area Wetlands Habitat Restoration.
- b. Moffatt & Nichol Engineers (Co-Applicant)
Contact: Richard Dornhelm, P.E.
3000 Citrus Circle, Suite 230
Walnut Creek, CA 94598
Tel: 510-944-5411, Fax: 510-944-4732, Email: mnengrs@ccnet.com
- Department of Parks and Recreation State of California (Co-Applicant)
Contact: Ronald Brean, Gold Rush District Superintendent
101 J Street
Sacramento, CA 95814
Tel: 916-445-7373, Fax: 916-327-3872
- Department of Water Resources State of California (Co-Applicant)
Contact: Curt Schmutte, Flood Protection and Geographic Information Branch
Central District Chief
3251 S Street
Sacramento, CA 95816
Tel: 916-227-7567, Fax: 916-227-7600, Email: schmutte@water.ca.gov.
- c. Moffatt & Nichol Engineers is a private, for profit environmental engineering company. The Department of Parks and Recreation and the Department of Water Resources are agencies of the State of California.
- d. Moffatt & Nichol Engineers Tax Identification Number: 95-1951343
Department of Parks and Recreation Tax Identification Number: 52-1692634
Department of Water Resources Tax Identification Number: 68-0303606
- e. Contact person - Richard Dornhelm of Moffatt & Nichol Engineers.
- f. Co-Applicants in Item b will enter into a formal agreement to collaborate (see MOU).
- g. RFP Project Group Types:

<u>Project Phase</u>	<u>Group</u>
I	3 Pre-Construction Services
II	1 Construction, and 3 Construction Management Services
III	3 Post-Construction Services

MEMORANDUM OF UNDERSTANDING

Franks Tract State Recreation Area Wetlands Habitat Restoration

THIS MEMORANDUM OF UNDERSTANDING is entered into this ___ day of July, 1997, by and between **DEPARTMENT OF PARKS AND RECREATION, STATE OF CALIFORNIA**, hereinafter referred to as "DPR", **DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA**, hereinafter referred to as "DWR", and **MOFFATT & NICHOL ENGINEERS**, hereinafter referred to as "Moffatt". DPR, DWR and Moffatt collectively may be referred to as "Parties." This Memorandum is entered into with respect to the following facts:

A. Franks Tract State Recreation Area ("SRA"), located in Contra Costa County, consists of two flooded Delta tracts totaling approximately 3300 acres owned by the State of California and operated by the DPR.

B. In 1990, DPR contracted with Moffatt to prepare an engineering Feasibility Study of constructing a number of islands to bolster the fish and wildlife resources of the SRA, serve as effective wave barriers to help protect the levees of neighboring islands, and expand the SRA's land base for recreational uses, in accordance with the goals of the General Plan for the SRA.

C. The Moffatt study identified numerous opportunities for island construction, and demonstrated the feasibility of obtaining and placing material to form islands that would meet the General Plan goals. Due to DPR funding constraints, the study recommended limited construction of demonstration islands along Piper Slough only; the islands were never constructed for lack of funding.

D. The Parties intend to proceed with implementation of the recommendations in the Moffatt study pertaining to the demonstration islands that provide primary benefits to fish and wildlife resources, and help to protect the levees of neighboring islands. This effort is to be funded through grants from the CALFED Bay Delta Program ("CALFED") and other available funding sources.

IT IS AGREED AS FOLLOWS:

1. The Parties will use good faith efforts to submit a joint proposal to CALFED on July 28, 1997 for funding of a phased project to construct demonstration islands in Franks Tract SRA, including completion of the CEQA/NEPA environmental review and permit process, preparation of construction documents, construction, and post-construction monitoring of the islands.
2. The Parties will use good faith efforts to incorporate the CALFED habitat restoration goals in the demonstration islands.
3. Moffatt will use good faith efforts to complete the CEQA/NEPA environmental review and permit process utilizing the services of an Environmental Consulting firm acceptable to DPR and DWR as required, prepare construction documents to enable

solicitation of competitive bids for construction under State/Federal procurement regulations, and assist with engineering support as needed during construction.

4. DWR will use good faith efforts to provide overall project management support, including use of its State contracting authority to enter into and service such agreements as may be needed for construction of the islands.
5. DPR will use good faith efforts to assist the completion of the CEQA/NEPA environmental review and permit process by serving as Lead Agency for Environmental Certification, and Applicant for all permits, and provide support for post-construction monitoring, utilizing the services of consultants as required.
6. This Memorandum may not be modified without written approval of the parties.
7. This Memorandum may be terminated at any time by any of the parties through written notification.
8. This instrument contains the entire agreement between the parties hereto with respect to the transactions contemplated herein.
9. All notices, requests, or other communications hereunder shall be in writing and shall be deemed to be duly given if personally delivered, sent by facsimile, or mailed to the parties as follows:

Ronald Brean
Gold Rush District
Department of Parks and Recreation
101 J Street
Sacramento, CA 95814
Tel: (916) 445-7373
Fax: (916) 327-8872

Curt Schmutte
Flood Protection and Geographic Information Branch
Department of Water Resources
3251 S. Street
Sacramento, CA 95816
Tel: (916) 227-7567
Fax: (916) 227-7600

Richard B. Dornhelm, P.E.
Moffatt & Nichol Engineers
3000 Citrus Circle, Suite 230
Walnut Creek, CA 94598
Tel: (510) 944-5411
Fax: (510) 944-4732

11. This Memorandum may be signed in counterparts, each of which will be considered an original and which together will constitute one and the same agreement.

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PROJECT DESCRIPTION

a. Project Description and Approach

Franks Tract State Recreation Area (SRA), located in Contra Costa County, consists of two flooded Delta Tracts totaling approximately 3300 acres owned by the State of California and operated by the Department of Parks and Recreation (DPR). In 1990, DPR contracted with Moffatt & Nichol Engineers (MNE) to prepare an engineering feasibility study of constructing a number of islands to bolster the fish and wildlife resources of the SRA, serve as effective wave barriers to help protect the levees of neighboring islands, and expand the SRA's land base for recreational use, in accordance with the goals of the General Plan for the SRA.

The MNE Study considered the feasibility of island construction in great detail. It included extensive hydrographic, topographic and geophysical field surveys. It also included detailed analyses of wind and wave conditions, tidal hydraulics and sediment transport. A section prepared by a wildlife biologist addressed existing habitat values and the potential for improvement of fish and wildlife resource values, among other non-engineering criteria. The study evaluated alternative sources of material for island construction, including the use of channel dredging spoils, but concluded that the most appropriate source was relic sand dunes in the submerged portion of the tract. Sediment samples from the selected borrow sites were analyzed for potentially objectionable constituents. The study described excavation and material placement methods to minimize water quality impacts during construction and help insure the formation of a stable island substrate for the establishment of tidal perennial aquatic habitat, shaded riverine aquatic habitat, and midchannel islands and shoals habitat. The study presented estimated construction costs for the work, including subsequent habitat monitoring. Due to funding constraints, only a demonstration project appeared to be possible; the study recommended the construction of four demonstration islands along Piper Slough; the islands were never constructed for lack of funding. A copy of the Project Summary Report is provided as an Attachment to this proposal because of its bearing on the proposed project.

The proposed project consists of implementation of the recommendations in the MNE Study pertaining to the demonstration islands that provide primary ecosystem benefits to fish and wildlife resources, and secondary wave protection benefits for the levees of neighboring islands. At this time, the recommendations in the study relating to expansion of the SRA's land base for recreational use will not be implemented. Given the substantial amount of study effort invested by DPR in the project, and the considerable support for the project by the public interest groups and resource agencies that participated in the numerous project meetings, the project is ready to start Environmental Certification and Permitting, Final Design

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and Construction Document Preparation, leading to a construction start within about a year, if funding becomes available.

The project has been phased to provide flexibility for funding. Phase I consists of the Pre-Construction Services to complete the Environmental Certification and Permitting, and the Final Design and Construction Document Preparation. Phase II consists of Construction and Construction Management Services. This phase could be broken into several steps. The minimum Phase II Project covered by this request consists of the demonstration islands recommended in the MNE study. However, should sufficient funds become available, Phase II Construction could include additional island construction opportunities as described in the MNE study, but deleted from the recommendations at the time because of the apparent lack of funds. Phase III consists of Post-Construction monitoring to evaluate the success of the habitat restoration effort.

The project consists of the construction of low islands in the flooded portion of Franks Tract, where existing water depths are typically about 10 ft. at mean tide level (MTL). The islands will be constructed as either stand-alone features or by extension of existing remnant levees using available on-site sand/peat soil. The minimum project will restore approximately 45 acres of flooded subtidal habitat to 34 acres of tidal perennial aquatic habitat and 11 acres of shaded riverine aquatic habitat. The proportions of the habitat types to be created can be adjusted during Phase I to better reflect CALFED ecosystem restoration goals. The project can also be adapted to create mid-channel islands and shoals habitat. The ability to restore these CALFED priority habitat types at Franks Tract is limited primarily by funding availability. The resource management goals of DPR favor restoration of parklands to their former (pre-modern) conditions, and are consistent with those of CALFED.

The project provides substantial ecosystem restoration benefits targeting CALFED's priority habitat types and species, as well as other significant benefits. These include wave sheltering for adjacent island levees that require greater than normal maintenance (and the attendant adverse impacts on stream bank habitat) because of the long open water fetches on Franks Tract, and recreational opportunity in a park setting for the public to experience the Delta ecosystem in a restored state.

b. Location

The proposed project is located at the Franks Tract State Recreation Area (SRA) in Contra Costa County as shown on Exhibit 1a. The SRA consists of two flooded Delta Tracts, Franks Tract and Little Franks Tract, as shown on Exhibit 1b. The

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area was submerged by levee breaks in the late 1930's before its acquisition by the State. The area is bordered by remnant levees and is accessible only by boat.

c. Expected Benefits

Franks Tract is currently flooded over 95% of its area. The existing water depths vary from about 7 feet MTL in the shallow portions, to about 20 feet MTL in the deeper portions where peat mining (prior to the levee breaks) once occurred, and averages about 10 feet MTL. The proposed minimum project will restore about 45 acres (greater acreage is possible depending on funding provided) from subtidal habitat to a combination of specific CALFED priority habitat types. Considering the 3300 acre expanse of Franks Tract, the loss of some subtidal habitat is more than compensated by the benefits associated with creation of the priority habitat types and the added diversity. Exhibit II identifies the specific species and habitat types that are targeted by this project. The primary benefits of the project are all those benefits directly or indirectly associated with restoration of the targeted habitat types, both to CALFED and to the resource management goals of the DPR. The secondary benefits are flood protection for adjacent islands in the form of wave sheltering for the fragile levees, and recreation in the form of opportunity for the public to experience the Delta in a restored state. Furthermore, implementation of the proposed project has progressed due to the planning and preliminary engineering already completed by DPR. The opportunity exists for CALFED to obtain tangible benefits for the targeted species relatively quickly, and to apply the ERPP adaptive management approach for the benefit of following restoration projects.

d. Background and Biological/Technical Justification

The biological justification for the project is the tangible benefits for the CALFED priority species that would result from the restoration of a portion of the subtidal aquatic habitat on Franks Tract to tidal perennial aquatic habitat, shaded riverine aquatic habitat, and midchannel islands and shoal habitat.

Dredge Material Islands (DMI's) similar to those in the proposed project have been constructed by the U.S. Army Corps of Engineers at Venice Cut and Donlon Islands using dredged material from the Stockton Deepwater Channel project. These islands are also noteworthy because of the monitoring that preceded and followed their construction about 8 years ago, which documents the Corps' largely successful effort to restore mid-channel island and shoal habitat. The wetland design parameters that allowed the targeted plant and animal communities to be established on the DMI's were used by MNE in the preliminary engineering for the project.

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The durability of the project is a concern because the island sites on Franks Tract are relatively exposed to long open water fetches. The coastal engineering expertise of MNE in wind wave analyses, 'soft' techniques for shoreline stabilization and sediment transport processes served as the basis for selecting island sites and stable island configurations. Techniques to facilitate rapid establishment of shoreline vegetation were incorporated in the project for ecosystem as well as engineering reasons. By providing monitoring and pro-active resource management by a dedicated Resources Agency in the post-construction phase, the long term benefits to the ecosystem can be assured.

The project differs from other similar projects in that material for island construction will be dredged from on-site sources. The MNE Study identified relic sand dunes and peat soils on Franks Tract that can be used for this purpose. Alternatively, suitable dredged material from other projects, including other CALFED projects attempting to create wetlands by removal of previously placed dredged material, could be considered on an opportunity basis. However, if large scale habitat restoration is to take place, the efficacy of on-site sources must be demonstrated, as the availability of suitable channel deepening spoils becomes increasingly scarce. Furthermore, due to the flooding of Franks Tract in the late 1930's, and cessation of agricultural activities, the subtidal elevations in the tract are on average only 10 ft. below MTL, rather than 15 ft. to 20 ft. as on most other reclaimed tracts, greatly reducing the volume of fill needed to develop the proposed islands. The concern over flooding of reclaimed tracts and the consequences on water quality should not be an issue at Franks Tract, since it has been flooded for nearly 60 years. Finally, land acquisition is not an issue, since the land is already in State ownership.

The proposed project is a continuing project. The concept of constructing dredge material islands was incorporated into the General Plan for the SRA prepared in 1989. The feasibility of the concept was demonstrated by the MNE study. The study recommended construction of a demonstration project to validate the island construction methods, costs and habitat restoration techniques. DPR invested approximately \$350,000 into island planning and preliminary engineering. The demonstration project was not constructed due to lack of funds for construction.

The development of the proposed project by DPR included numerous meetings with the public and representatives of the various resource agencies. Reaction to the proposed demonstration islands was favorable, and no apparent opposition to the project emerged.

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e. Proposed Scope of Work

The proposed Demonstration Island Construction is shown on Exhibit 1c and fully described in the attached MNE Project Summary Report (see Section IV - Recommended Demonstration Project). For information on additional islands that could be constructed (if sufficient funds are available), the complete study report must be consulted.

The proposed Scope of Work for completing the project, with a list of tasks and deliverable items, is presented in Exhibit III. Grant funding for all tasks is being requested from CALFED unless otherwise noted in the Exhibit. Technical and financial reports will be prepared and submitted to CALFED on a monthly basis for the duration of the Phases I and II summarizing the progress on task completion, discussing specific problems or noteworthy events, and tracking expenditure of grant funds. Reports will be submitted annually for the work during Phase III (post-construction monitoring).

The Scope of Work specifically cover the minimum demonstration island project proposed. In Phases I the opportunity to add more islands to the project will be addressed if funding becomes available. The preliminary engineering and environmental certification for the additional islands will be a part of Phase I with consideration for funding by a subsequent CALFED grant cycle, unless CALFED finds it advantageous to fund the additional islands at this time.

f. Monitoring and Data Evaluation

Post-construction Monitoring is necessary to demonstrate the efficacy of the proposed demonstration islands in restoring the targeted habitat types and aiding the targeted species. The details of the monitoring effort will be defined during Phase I (pre-construction services) as part of the Environmental Certification and Permit Process.

The task of monitoring construction is included with Phase II work. As a demonstration project, the monitoring will not only be directed at the usual concern over conformance by the construction contractor with the requirements of the plans and specifications, but also with evaluation of the constructability of the innovative engineering features incorporated in the design.

g. Implementability

Due to the planning and preliminary engineering already completed by DPR, implementation of the proposed project is relatively straight forward. The project was formulated in compliance with current (1990) laws and regulations, and

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resource agency concerns. Several public meetings were conducted and no apparent opposition to the proposed project surfaced. The restoration of the priority habitat types by construction of islands at Franks Tract does not appear to conflict with, or compromise CALFED's mission, or its developing implementation strategy.

Local support for the project has been favorable primarily because of perceived flood protection benefits. Local concern has always existed over high levee maintenance and vulnerability due to the long open water fetches on Franks Tract. Concerns by recreational boaters, hunters and fisherman that frequent the area were addressed in the development of the project.

Land uses will not be altered by the proposed project. The area has been, and will remain in Park use.

Sediment tests during the Preliminary Engineering Study did not detect significant levels of compounds considered hazardous under California Admin Code Title 22 procedures. Heavy metals detected in the area soils appeared to represent background levels; no other potentially hazardous compounds were detected.

Title to the land within Franks Tract already resides with the State of California.

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COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

a. Budget Costs

Budget costs for project phases and tasks are presented on Exhibit IV. The Construction Cost Estimate is based on the 1991 MNE study, inflated to the proposed date of construction (1998). This proposal requests CALFED funding of all phases and tasks, including consideration of the request to support construction of additional islands beyond the minimum demonstration project if sufficient funding is available.

CALFED funding is required to implement the proposed project; not shown in the budget is the \$350,000 previously expended by DPR for the planning and preliminary engineering. Neither DPR nor DWR have funding for implementation. O&M costs for the constructed habitat, which are expected to be minimal, will be cost shared by DPR within the context of its overall O&M responsibility for the SRA. The O&M costs are not shown in the budget. Overall project coordination to assure conformance with CALFED's concurrent activities in the Delta will be cost shared by DWR. The DWR share will be contributed in the form of in-kind services, estimated to be about \$20,000 over the life of the project. These coordination costs are not shown in the budget.

The CALFED funding can be provided in increments corresponding to each phase. The minimum initial increment corresponds to Phase I. Construction in Phase II can be provided in increments if additional islands are incorporated in the project. Although the minimum demonstration project includes four islands, which suggests the possibility to increment this work, as well, the unit cost per island would escalate considerably due to fixed costs of mobilization if the minimum project were reduced in scope. Conversely, the unit costs would diminish if the minimum project were expanded to construct the additional islands at the same time.

The items of work to be contracted out are:

Phase I - Environmental Review Services - recommend sole source subcontract with Jones & Stokes Associates based on unique qualifications.

Phase II - Construction - recommend competitive Bid Solicitation using State construction contract procurement procedures.

Phase III - Monitoring Services- recommend subcontract with competitive qualifications based selection using professional services contract procurement procedures.

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b. Schedule Milestones

A Schedule with milestones is presented on Exhibit V.

Payment requests for work progress will be submitted together with the proposed technical/financial reports on a monthly basis during Phases I and II, and with the annual monitoring report during Phase III.

c. Third Party Impacts

Third party impacts have been identified for:

Neighboring Island Levees - beneficial impact on local reclamation districts due to wave sheltering that will reduce levee vulnerability and maintenance; also beneficial impact on State because its liability exposure arising from waves generated on Franks Tract SRA will reduce.

SRA Recreationists - net beneficial impact on boaters, hunters and fisherman due to ecosystem restoration, although loss of some deeply flooded habitat will possibly concern bass fishermen.

State Water Agencies - beneficial impact due to reduced risk of levee failure on neighboring islands and the adverse impacts that such a levee failure would have on Delta water quality.

Based on the public participation process conducted by DPR during the planning and preliminary engineering for the project, the project appears to be self mitigating with no known opposition. A special public participation process has not been included in this proposal. The environmental certification and permit process should provide sufficient opportunity for public interest and resource agency review of this project.

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APPLICANT QUALIFICATIONS

a. Moffatt & Nichol Engineers

Restoration of wetlands requires expertise in various engineering disciplines. A feasible design draws from the experience of civil and hydrologic engineers, combined with wetland biologists and coordinated with the resource agencies to form a workable solution.

Key elements involved in a wetlands project include dredging and disposal plan, vegetation plan, utility relocation, hydraulics, and culvert design. Moffatt & Nichol Engineers has experience in each of the areas and includes the development and application of hydrodynamic and water quality modeling. Models have been developed and calibrated in wetlands specifically for the design of wetlands. Modeling using accurate dynamic algorithms and prototype data are invaluable aids in the design process.

Moffatt & Nichol Engineers provides a wide range of services, with one of the largest coastal engineering staffs in the United States, complemented by an experienced civil and hydrologic engineering staff, the firm is capable of handling large and diverse wetlands design projects. We have a rapport with resource agencies and have worked with the leading biologists in the area to study and design wetlands. Wetland design is a service which Moffatt & Nichol Engineers provide with the same dedication that has earned us respect as a leader in waterfront facility design for over 45 years. Representative project experience includes:

Franks Tract State Recreation Area. Moffatt & Nichol Engineers developed preliminary engineering documents for an island demonstration project that will restore wildlife habitat, provide wave protection benefits, and increase the recreational land base at the flooded 3,300 acre Delta tract.

Pierce Island Wetlands Habitat Restoration. Moffatt & Nichol Engineers managed the environmental certification process, obtained required permits and prepared plans, specifications and estimates for wetlands habitat restoration at Pierce Island. Approximately 100,000 cubic yards of dredged material was used to cover abandoned sewage treatment lagoons on the island. The project provided for partition of the 74 acre island into a wetland habitat mitigation area and a dredged material management area.

Batiquitos Lagoon Enhancement Project. Moffatt & Nichol Engineers refined concepts and developed construction documents with cost estimates to return Batiquitos Lagoon to a productive estuary. The project included the creation of a

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tidal inlet, the construction of two jetties, protection of five bridges and a dredging program in the lagoon to restore the tidal prism, which will promote a stable ocean entrance, provide the desired water quality, and create specific subtidal and intertidal areas.

Bolsa Chica Wetland Restoration. Moffatt & Nichol Engineers developed a wetland restoration plan for over 900 acres of coastal wetlands. Tidal water flow through the wetlands was determined using specialized hydraulic engineering and numerical models. Various tide control structures were designed to provide the desired flow conditions and to restore the wetlands.

Laguna Grande and Roberts Lake Restoration. Moffatt & Nichol Engineers provided preliminary engineering, and final design for the restoration of the lakes, near Monterey, CA. Restoration required dredging and disposal of over 120,000 cubic yards of accumulated lake sediments, and excess vegetation that choked the once open waters of the lakes. It also included creek channel improvements, construction of waterfowl islands, fishing piers, observation platforms and trails.

Anaheim Bay Mitigation Moffatt & Nichol Engineers developed a wetland restoration plan for 117 acres in Anaheim Bay. The project was required to replace critical habitat lost in San Pedro Bay because of port development. The mitigation plan created various types of wetlands and submerged lands, as specified by resource agencies.

b. Jones & Stokes Associates (Recommended Environmental Subconsultant)

Comprehensive Environmental and Habitat Restoration Experience. The Jones & Stokes Associates Team is experienced in environmental restoration, including planning, design, and construction. Team members have worked together on numerous projects. Our greatest ability is to integrate restoration opportunities with flood control designs to achieve both flood control protection and environmental restoration. The Jones & Stokes Associates Team provides multidisciplinary services to meet the objectives of natural resource management, habitat restoration and mitigation, and environmental compliance and permitting. Our Team has acquired extensive experience in restoring riparian systems and wetland communities by designing, implementing, maintaining, and monitoring restoration projects throughout California. We have developed a habitat restoration philosophy that is a systems-based approach, integrating the vegetation and wildlife resources of the restored habitat into the surrounding landscape and connecting watersheds. We have been involved with creating and restoring over 1,100 acres of wetlands and riparian communities in the last 6 years.

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c. Project Principal Personnel

Richard B. Dornhelm, P.E. The principal in the project for MNE is Mr. Dornhelm. He brings more than 30 years of specialized experience in engineering for coastal and riverine construction, including numerous wetlands habitat restoration projects. As Project Manager, Mr. Dornhelm has directed many multidisciplinary projects requiring progressive team organization and supervision, and stringent project budget and schedule controls. His understanding of the complex project permit and approval process has honed his ability to build consensus for project implementation. His years of experience in the preparation of engineering plans, specifications and estimates has been a major factor in the successful implementation of the projects he has managed.

Ronald Brean. The primary principal in the project for DPR is Mr. Brean. He is currently the District Superintendent for DPR's Gold Rush District, which includes the Delta park units. Mr. Brean has nearly 27 years experience in managing natural and cultural park units throughout California and has an educational background in zoology with an emphasis on wildlife management. District staff resources available to Mr. Brean include a State Park Resource Ecologist, park maintenance personnel, and ranger staff.

Curt Schmutte. The principal in the project for DWR is Mr. Schmutte. He previously lead the System Integrity component for the CALFED program and has implemented difficult Delta levee, habitat, and barrier projects. As program manager for the CALFED Levee and Channel Technical Team, he was responsible for successfully developing the vision, plan, organization, process and schedule for this very important component. As manager of DWR's SB 34/AB 360 program, he has managed over \$30 million in Delta levee improvement projects including difficult mitigation elements. Mr. Schmutte has also managed subsidence studies and pilot projects with the Long-Term Management Strategy program to study the viability of using San Francisco Bay dredged material on Delta levees. He has a thorough knowledge of the Delta, and is currently managing two Category III Habitat Development/Restoration projects. He has worked on projects at Franks Tract SRA in connection with levee protection for neighboring islands.

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COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

Proposal Forms required of Moffatt & Nichol Engineers for Services/Private Contracts follow this page. DPR and DWR are not required to submit any forms at this time.

With regard to the general terms and conditions, deviation is requested for item 9 on page 35 of the RFP. Indemnification will be provided for general liability and for professional errors and omissions in a form consistent with our ability to insure those risks under our insurance coverages.

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NONDISCRIMINATION COMPLIANCE STATEMENT

MOFFATT & NICHOL ENGINEERS

COMPANY NAME

The company named above (hereinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on this date and in the county below, is made under penalty of perjury under the laws of the State of California.

RICHARD B. DORNHELM

OFFICIAL'S NAME

7-24-97

DATE EXECUTED

Richard B. Dornhelm

PROSPECTIVE CONTRACTOR'S SIGNATURE

EXECUTED IN THE COUNTY OF

CONTRA COSTAVICE PRESIDENT

PROSPECTIVE CONTRACTOR'S TITLE

MOFFATT & NICHOL ENGINEERS

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

FRANKS TRACT STATE RECREATION AREA WETLANDS HABITAT RESTORATION

Item 12

Agreement No. _____

Exhibit _____

**STANDARD CLAUSES --
SMALL BUSINESS PREFERENCE AND CONTRACTOR IDENTIFICATION NUMBER**

NOTICE TO ALL BIDDERS:

Section 14835, et. seq. of the California Government Code requires that a five percent preference be given to bidders who qualify as a small business. The rules and regulations of this law, including the definition of a small business for the delivery of service, are contained in Title 2, California Code of Regulations, Section 1896, et. seq. A copy of the regulations is available upon request. Questions regarding the preference approval process should be directed to the Office of Small and Minority Business at (916) 322-5060. To claim the small business preference, you must submit a copy of your certification approval letter with your bid.

Are you claiming preference as a small business?

_____ Yes*

✓
_____ No

*Attach a copy of your certification approval letter.

EXHIBITS

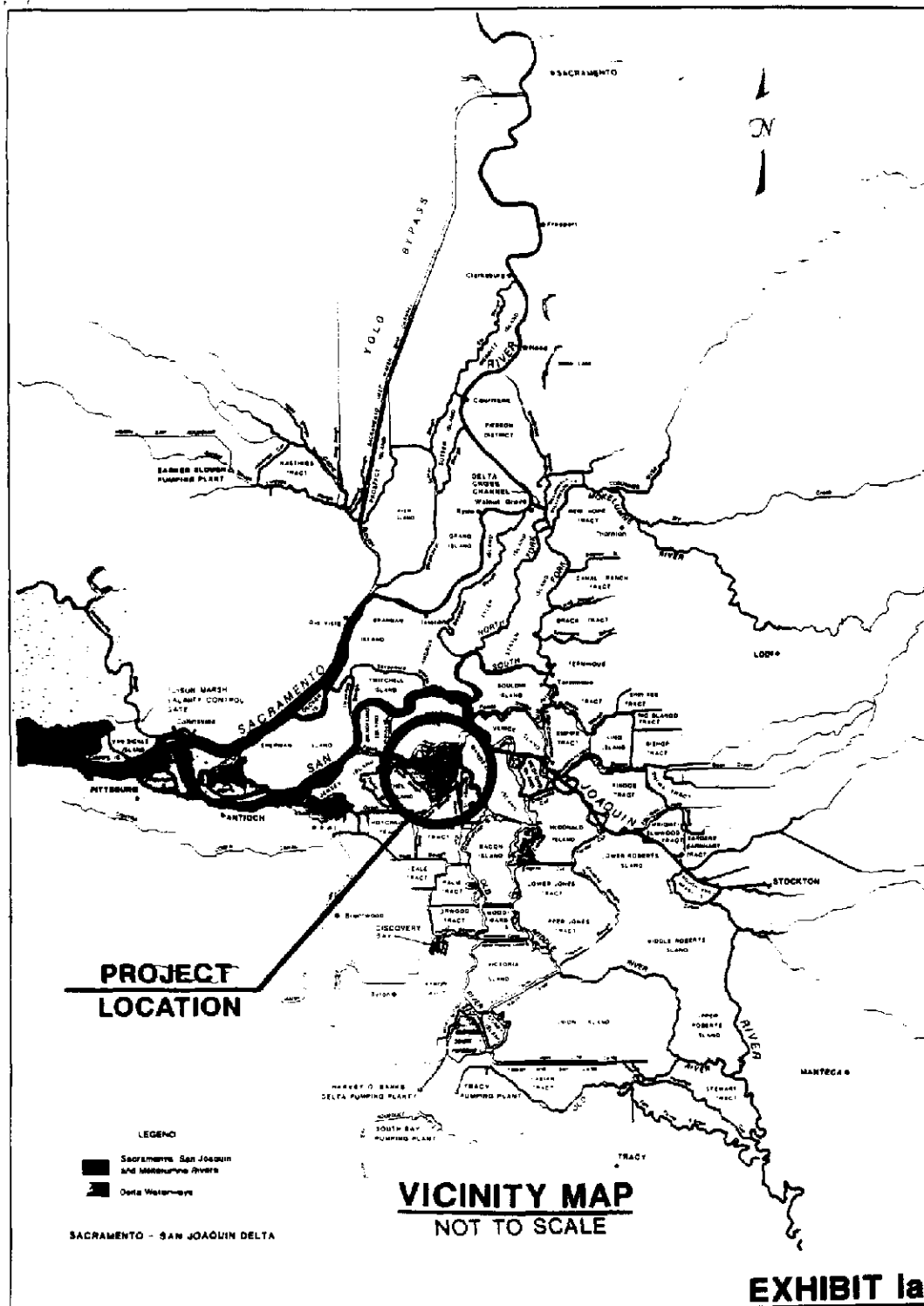
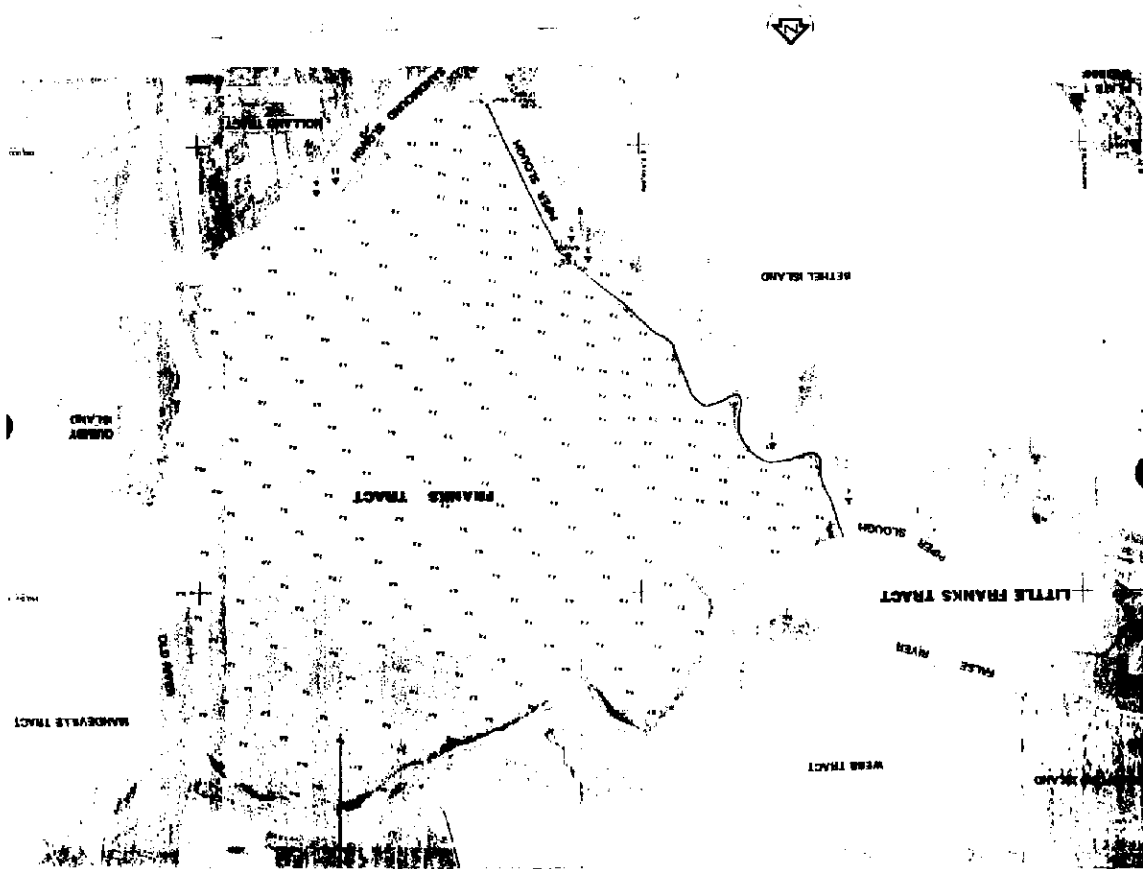


EXHIBIT 1b

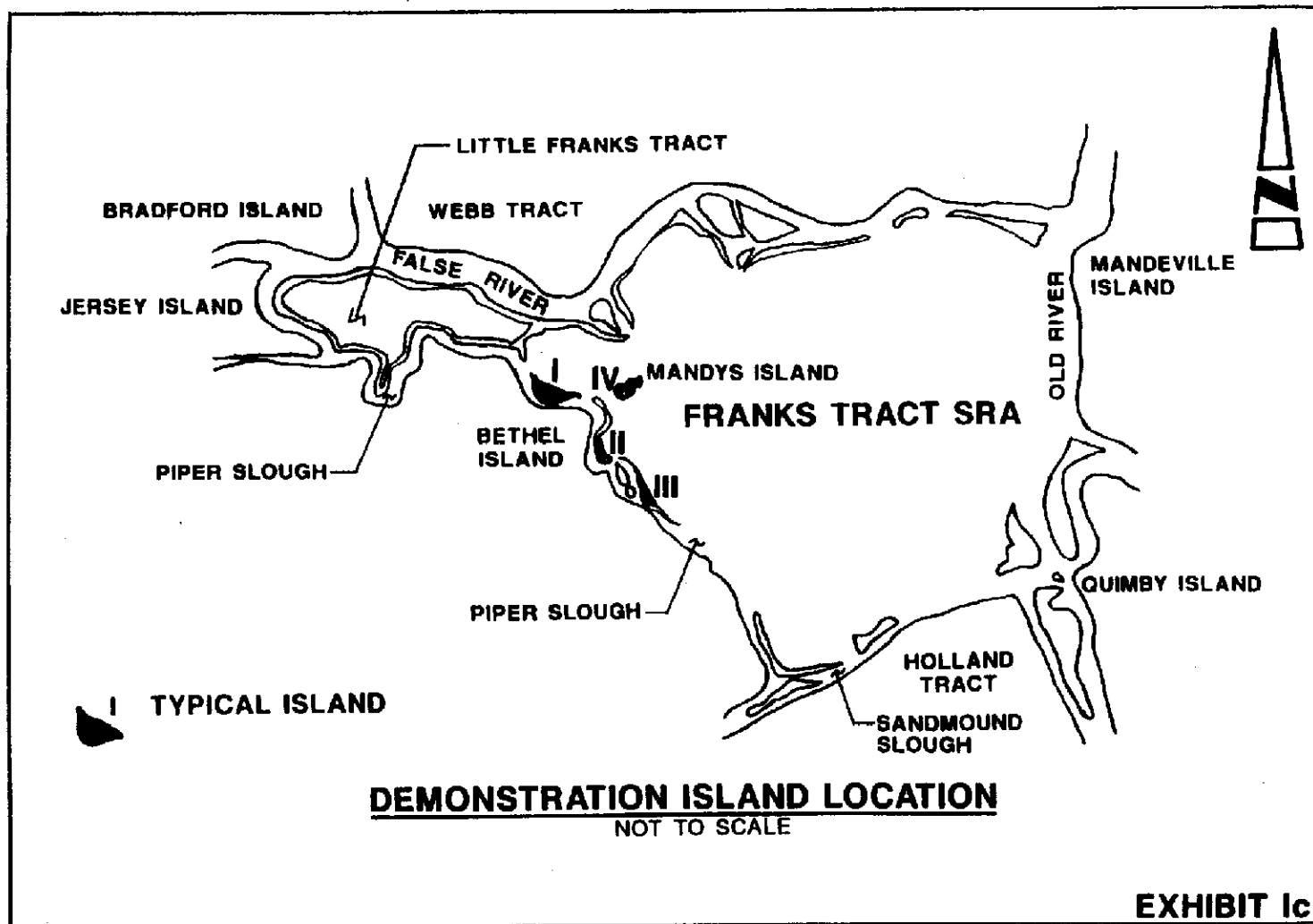
SITE PLAN
NOT TO SCALE



I - 0 0 4 7 4 5

I-004745

I-004746



I-004746

FRANKS TRACT WETLANDS HABITAT RESTORATION

BENEFITS FOR PRIORITY HABITATS AND SPECIES

PRIORITY HABITATS

✓	TIDAL PERENNIAL AQUATIC HABITAT (FRESHWATER)
	SEASONAL WETLAND AND AQUATIC HABITAT
	INSTREAM AQUATIC HABITAT
✓	SHADED RIVERINE AQUATIC HABITAT
	SALINE EMERGENT WETLANDS HABITAT (TIDAL)
✓	MIDCHANNEL ISLANDS AND SHOAL HABITAT
	NORTH DELTA AGRICULTURAL WETLANDS AND PERENNIAL GRASSLANDS

PRIORITY SPECIES

✓	SAN JOAQUIN AND EAST-SIDE DELTA TRIBUTARIES FALL-RUN CHINOOK SALMON
✓	WINTER-RUN CHINOOK SALMON
✓	SPRING-RUN CHINOOK SALMON
✓	LATE-FALL RUN CHINOOK SALMON
✓	DELTA SMELT
✓	LONGFIN SMELT
✓	SPLITTAIL
✓	STEELHEAD TROUT
	GREEN STURGEON
✓	SECONDARY PRIORITIES INCLUDE STRIPED BASS AND MIGRATORY BIRDS

EXHIBIT II

CALFED- FRANKS TRACT WETLANDS HABITAT RESTORATION PROPOSED SCOPE OF WORK

PHASE	TASK	COAPPLICANT LEAD	DELIVERABLE
1-PRECONSTRUCTION	1.00 ENVIRONMENTAL CERTIFICATION	MNE	
	1.01 PREPARE ADMIN DRAFT I.S.	JSA*	ADMIN DRAFT-INITIAL STUDY
	1.02 PREPARE DRAFT I.S.	JSA*	DRAFT-INITIAL STUDY
	1.03 PREPARE MITIGATION PLAN	JSA*	MITIGATION PLAN
	1.04 PREPARE NEG. DEC.	JSA*	NEG. DEC.
	1.05 CERTIFY CEQA	DPR	CEQA CERTIFICATION
	1.06 OBTAIN PERMITS	DPR	PERMITS
	1.07 PREPARE MONITORING PROGRAM	JSA	MONITORING PROGRAM
	1.08 PREPARE BASIS OF DESIGN	MNE	BASIS OF DESIGN REPORT
	1.09 PREPARE PS & E, 60%	MNE	PLANS, SPEC & ESTIMATES
	1.10 PREPARE PS & E, 90%	MNE	PLANS, SPEC & ESTIMATES
	1.11 PREPARE PS & E, 100%	MNE	PLANS, SPEC & ESTIMATES
2- CONSTRUCTION	1.12 PREPARE PS & E, FINAL	MNE	PLANS, SPEC & ESTIMATES
	2.00 CONTRACT CONSTRUCTION	DWR	
	2.01 SOLICIT BIDS	DWR	PROGRESS REPORT
	2.02 AWARD CONTRACT	DWR	PROGRESS REPORT
	2.03 MANAGE CONSTRUCTION	DWR	PROGRESS REPORT
3- POST CONSTRUCTION	2.04 CONSTRUCTION	DWR	PROGRESS REPORT
	3.00 MONITORING	DPR	
	3.01 YEAR 1	DPR	ANNUAL REPORT
	3.02 YEAR 2	DPR	ANNUAL REPORT
	3.03 YEAR 3	DPR	ANNUAL REPORT

* RECOMMENDED SUBCONSULTANT

EXHIBIT III

FRANKS TRACT WETLANDS RESTORATION - BUDGET COSTS

Prepared for: CALFED

Prepared by: Moffatt & Nichol Engineers

Submitted: July 28, 1997

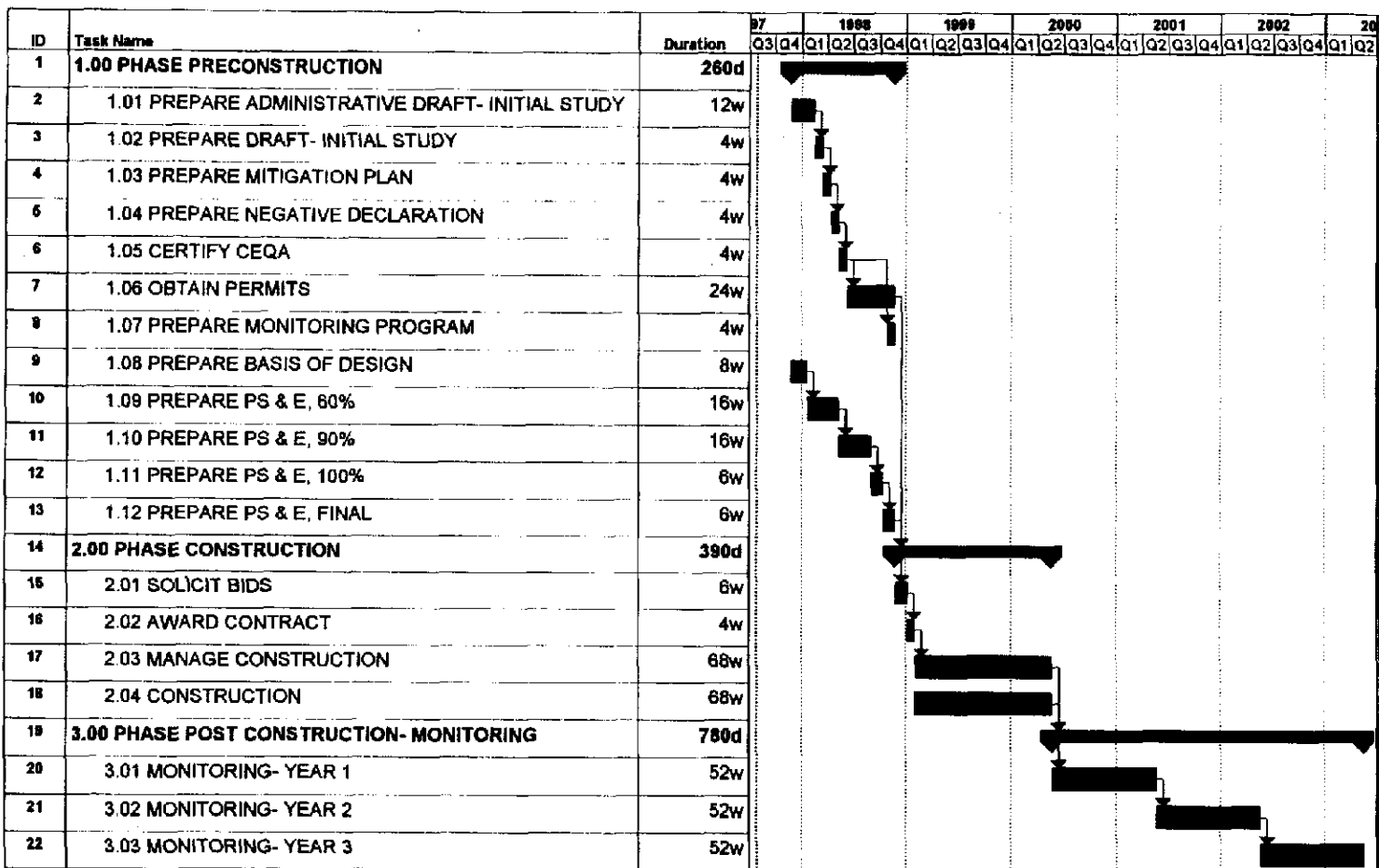
28-Jul-97

Phase No.	Item	Direct Labor Hours	Direct Salary and Benefits	Overhead Labor (General, Admin and fee)	Service Contracts	Material and Acquisition Contracts	Miscellaneous and other Direct Costs	Total Cost
			\$ 120					
1.00	Preconstruction							
1.01	Prepare Administrative Draft - Initial Study				\$ 41,873			\$ 41,873
1.02	Prepare Draft - Initial Study				\$ 6,398			\$ 6,398
1.03	Prepare Mitigation Plan				\$ 1,927			\$ 1,927
1.04	Prepare Negative Declaration				\$ 4,620			\$ 4,620
1.05	Certify CEQA	160	\$ 5,436					\$ 5,436
1.06	Obtain Permits	160	\$ 5,436		\$ 19,448			\$ 24,884
1.07	Prepare Monitoring Program				\$ 5,016			\$ 5,016
1.08	Prepare Basis of Design	150	\$ 18,000				\$ 500	\$ 18,500
1.09	Prepare PS&E, 80%	440	\$ 52,800				\$ 1,000	\$ 53,800
1.10	Prepare PS&E, 90%	270	\$ 32,400				\$ 1,500	\$ 33,900
1.11	Prepare PS&E, 100%	180	\$ 21,600				\$ 1,500	\$ 23,100
1.12	Prepare PS&E, Final	80	\$ 9,600				\$ 2,500	\$ 12,100
	Phase Total	1,440	\$ 145,272	\$ -	\$ 79,281	\$ -	\$ 7,000	\$ 231,553
2.00	Construction							
2.01	Solicit Bids	200	\$ 6,800					\$ 6,800
2.02	Award Contract	100	\$ 3,400					\$ 3,400
2.03	Manage Construction	3,000	\$ 102,000					\$ 102,000
2.04	Construction	850	\$ 28,889			\$ 4,127,000		\$ 4,156,889
	Phase Total	4,150	\$ 141,089	\$ -	\$ -	\$ 4,127,000	\$ -	\$ 4,268,089
3.00	Post Construction - Monitoring							
3.01	Monitoring - Year 1	208	\$ 7,000		\$ 20,000			\$ 27,000
3.02	Monitoring - Year 2	212	\$ 7,200		\$ 20,500			\$ 27,700
3.03	Monitoring - Year 3	218	\$ 7,400		\$ 21,000			\$ 28,400
	Phase Total	635	\$ 21,600	\$ -	\$ 61,500	\$ -	\$ -	\$ 83,100
	PROJECT TOTAL	6,225	\$ 307,961	\$ -	\$ 140,781	\$ 4,127,000	\$ 7,000	\$ 4,582,742

EXHIBIT IV

1-004749

1-004749



Project: FRANKS TRACT SCHEDULE
Date: Mon 7/28/97

Task

Progress

Milestone

Summary

Rolled Up Task

Rolled Up Milestone

Rolled Up Progress

EXHIBIT V

ATTACHMENT

F1-216

FRANKS TRACT SRA
PRELIMINARY ENGINEERING
PROJECT SUMMARY REPORT

APRIL, 1991

PREPARED FOR:

STATE OF CALIFORNIA
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001

PREPARED BY:

MOFFATT & NICHOL, ENGINEERS
3000 CITRUS CIRCLE, SUITE 230
WALNUT CREEK, CA 94598

2847-14

EXECUTIVE SUMMARY

INTRODUCTION

Franks Tract State Recreation Area (SRA) is located in the Central Delta as shown on Figure ES. The SRA consists of two flooded Delta tracts, Franks Tract and Little Franks Tract, bordered by remnant levees and accessible only by boat.

A General Plan was prepared for Franks Tract SRA by the California Department of Parks and Recreation. The Plan attempts to balance the needs of recreational users with the need to protect the fragile ecosystem of the Delta. The Plan proposes, if technically feasible, an expansion of the area's land base by constructing a number of islands that would support basic recreational facilities. These man-made islands could also provide additional wetlands habitat to bolster the fish and wildlife resources of the area and in serve as effective wave barriers to help protect the levees of neighboring islands. A preliminary engineering study has just been completed to develop a practical approach to the construction of specific demonstration islands in accordance with the Plan.

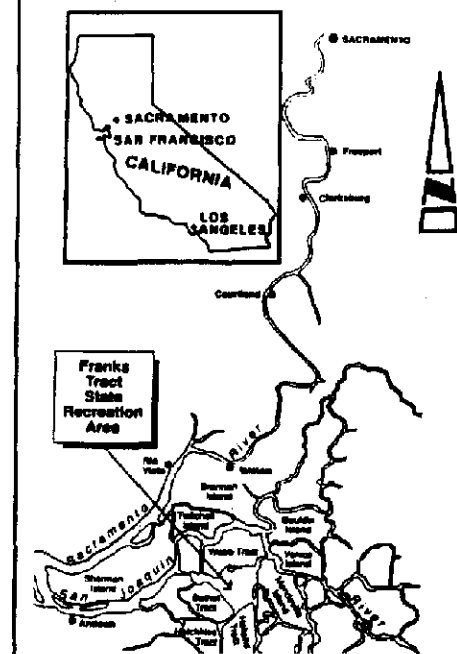
The project funding source is primarily from the Legislative Bond Act. The California Wildlife and Park Conservation Act (Prop. 70) includes up to \$4 million to implement projects consistent with the Franks Tract SRA General Plan. These funds could apply to the proposed demonstration project.

The Delta Flood Protection Act (S.B. 34) provides up to \$6 million annually through a Special Flood Control Projects Program to implement flood protection projects for eight western delta islands, several of which adjoin Franks Tract SRA. These funds could also apply to the demonstration project.

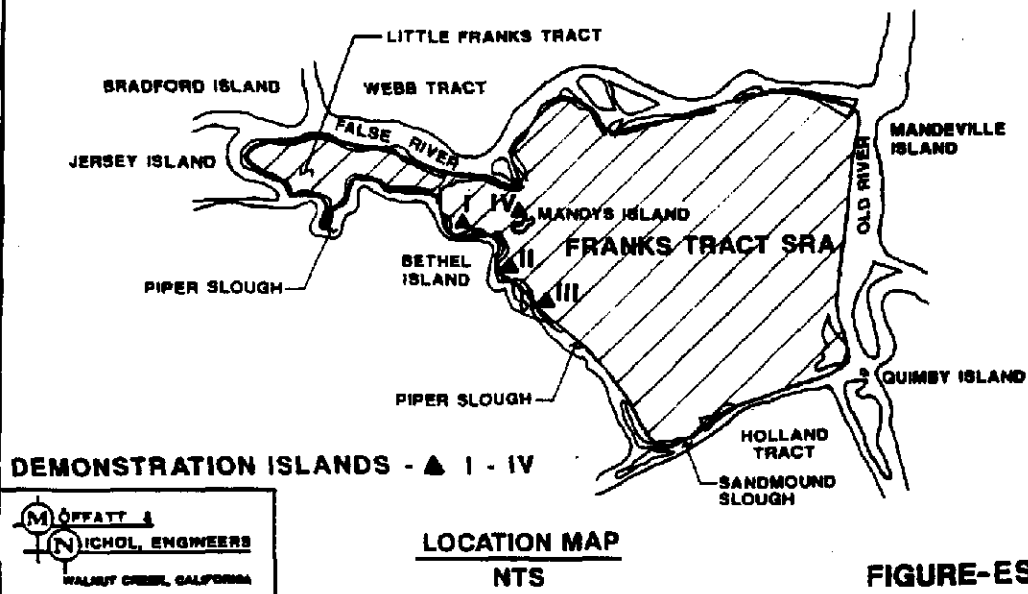
This report summarizes the recommendations of the study. Two public workshops and a Federal/State/Local interagency coordination meeting have been held to discuss the project with interested parties.

Figure ES

STATE OF CALIFORNIA
DEPARTMENT OF PARKS & RECREATION



VICINITY MAP
NTS



LOCATION MAP
NTS

FIGURE-ES

PROJECT LOCATION

I - 0 0 4 7 5 5

I-004755

RECOMMENDATIONS AND SELECTION CRITERIA

This report specifically recommends construction of four demonstration "Island" fills located in the westerly portion of Franks Tract SRA for consideration as highest priority of work to be funded from the four million dollars available from the California Wildlife and Park Conservation Act (Proposition 70). Construction of a section(s) of a wall along Piper Slough is feasible and is recommended for consideration as next priority work, if additional funds or credits for mitigation enhancement become available. The following key criteria were established to measure feasibility of the alternative demonstration projects evaluated:

1. Provides recreation benefits;
2. Provides wetland habitat benefits;
3. Provides secondary wave protection for Bethel Island levees.

Additional criteria considered during the evaluation of the alternatives were:

1. Cost of project(s) proposed within available funding.
2. Engineering factors are such that the project(s) have a reasonable chance of success.
3. Environmental approval of selected project(s) obtainable in a reasonable period of time.
4. Project(s) minimize maintenance and operation costs.
5. Project(s) minimize liability and safety issues.
6. Project(s) may be eligible for wetland habitat enhancement credits under Delta Flood Protection Act (S.B. 34).

The amount of weight given to the secondary wave protection criteria for Bethel Island levees was not completely resolved during the public meetings and discussions between local Bethel Island elected officials, residents and State agencies' technical and operations staff.

Construction of a small section of demonstration walls within available funding may be appropriate to evaluate wave reduction effectiveness. This would require a reduction in island fill sizes and agreement on priority, given its main emphasis on wave protection for Bethel Island levees.

DEMONSTRATION PROJECT

The proposed demonstration project consists of four separate island fills located in the westerly portion of Franks Tract as shown on Figure ES. Islands I, II and III are placed in coves on the Franks Tract side of the Piper Slough levee. A single groin is proposed at the southerly limit of Island III to help retain the beach fill. Island IV is an enlargement of an existing partially submerged island (Mandy's Island) located nearby and between cove fill areas I and II. As summarized in Table ES, "Islands" I and II are designed specifically for wetland habitat values while "Islands" III and IV are being designed for recreation access use. "Islands" I and II provide flood (wave) protection and habitat mitigation credit as secondary benefits; "Island" III provides wetlands habitat, wave protection and habitat mitigation as secondary benefits; "Island" IV (Mandy's Island) provides secondary wetland and habitat mitigation values.

The surplus wetlands benefits created by these islands should be suitable to mitigate habitat losses resulting from levee maintenance on neighboring islands, thereby facilitating levee repairs and generating indirect flood control benefits as well.

Materials for the island fills will be taken from relic sand mounds located in the central portion of Franks Tract. A total of about 1 million cubic yards of material will be removed by hydraulic dredge and placed in a series of lifts. Placement of the material will be controlled to minimize impacts on existing wetlands vegetation in the area, and on water quality. Control will also be necessary to help insure stability of the remnant levee against which the fills will be placed, and proper blending of the fill with soft organic soils for vigorous plant growth.

Vegetation should propagate naturally on the islands in the shallow water areas; seeding and planting are proposed for the riparian areas. During the period of plant establishment, passive use of the recreational beaches can be permitted. As the vegetation matures, more intensive use may be permitted, including boat-in picnicking and camping.

**TABLE ES - DEMONSTRATION PROJECT SUMMARY
FRANKS TRACT STATE RECREATION AREA**

DESCRIPTION	FILL SITE				
	I	II	III	IV	TOTAL
ESTIMATED FILL VOLUME ¹ cu yds)	295,00 0	175,00 0	384,00 0	116,00 0	970,00 0

¹Total includes allowance for construction losses and fill subsidence.

NET CHANGE IN AREA ² (Acres)					
Riparian	0	0	+9.6	+1.3	+10.9
Shallow Water	+13.4	+7.7	+6.4	+6.7	+34.2
Subtidal	- 13.4	- 7.7	- 16.0	- 8.0	- 45.1
BENEFITS ³					
Recreation			P	P	
Wetlands	P	P	S	S	
Flood Protection	S	S	S		
Mitigation Credit	S	S	S	S	

The estimated cost of the proposed Demonstration Project is \$3.6 million. This cost is based on 1991 construction dollars, and includes project administration and engineering fees. As a

²Riparian (includes Recreational Beach) is above elevation +4 ft. NGVD; Shallow Water (includes Intertidal Area) is between elevation +4 and -2 ft. NGVD; Subtidal is below elevation -2 ft. NGVD.

³Primary Benefits designated P, Secondary Benefits designated S; Mitigation Credit applies to levee maintenance on neighboring islands.

Demonstration Project, monitoring should be performed following construction. Monitoring will determine the extent to which the anticipated project benefits have been realized, including wetlands creation and recreational utilization.

ENVIRONMENTAL REVIEW

The proposed demonstration project is subject to environmental review under both Federal (NEPA) and State (CEQA) laws. Interested persons will have an opportunity to participate in the review of the project as it progresses through the environmental certification and permitting process.

PROJECT SCHEDULE

Implementation of the proposed demonstration project will require about 30 months. This schedule is based on a fast-track approach, where environmental certification and permit acquisition occur concurrently with final design and construction contract preparation during the first 12 months. Contract construction then follows over a period of about 18 months. This schedule does not include the monitoring phase of the project, which begins immediately following construction and continues for a period of up to 5 years.

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3	Prevailing Wave Conditions
4	Extreme Wave Conditions
5	Summary of Testing for Metals
6	Beach Fills - Preliminary Project Cost Estimate
7	Permits

I. INTRODUCTION

A General Plan was prepared for Franks Tract State Recreation Area (SRA) by the California Department of Parks and Recreation in 1988. The Plan attempts to balance the needs of recreational users with the need to protect the fragile ecosystem of the Delta. If feasible, the plan proposes an expansion of the land base in Franks Tract by constructing a number of islands that would support basic recreational facilities. These man-made islands could also provide additional wetlands habitat to bolster the fish and wildlife resources of the area, and, in some cases, serve as effective wave barriers to help protect the levees of neighboring islands.

Preliminary engineering for further planning of the proposed islands included the following scope of work. The objective of this work was to refine the conceptual plan for the islands presented in the General Plan, and to develop a practical approach for constructing demonstration islands.

1. Surveys

The area of Franks Tract, including the remnants of the former levees and portions of adjacent slough (Piper Slough) were to be surveyed.

2. Geotechnical Investigations

The subsurface sediments were to be explored using both barge-mounted drilling equipment and geophysical profiling instrumentation.

3. Wind and Wave Patterns

Wind and wave conditions on Franks Tract were to be

analyzed to aid in developing islands that are both resistant to wave attack and effective in screening waves.

4. Sediment Transport

The sediment transport processes that influence the stability of the island fill material were to be analyzed for Franks Tract.

5. Non-Engineering Criteria

There are several non-engineering issues pertaining to Franks Tract improvements that were to be explored. Those issues included boating, fishing and hunting use patterns; waterfowl and fish habitat enhancement; and related resource management goals.

6. Island Fill

Potential sources of island fill material, both on and off Franks Tract, were to be identified, and methods of fill placement evaluated. Chemical testing to identify presence of potentially hazardous materials in Franks Tract sediments was to be performed.

7. Pilot Program

Configurations and locations for construction of demonstration islands were to be investigated.

8. Demonstration Structures

Construction of islands for recreation purposes may be more cost effective if combined with man-made structures. In some cases, structures alone may

accomplish the General Plan goals. Structures to help contain island fill material were to be investigated to enhance island stability.

9. Piers, Docks and Platforms

Structural systems and locations were to be evaluated for these public recreation facilities.

10. Little Franks Tract Interpretive Trail

The General Plan indicated that Little Franks Tract improvements include an interpretive trail, or channel, for small boats. Access improvements at existing levee breaks were to be analyzed.

11. Horseshoe Bend Bypass

A Horseshoe Bend Bypass Channel was to be analyzed. The bypass was to be studied for enhancing access to Little Franks Tract and protecting Bethel Island levees.

12. Permits and Programs of Others

Many public entities have expressed an interest in the proposed improvements. A listing of the agencies with jurisdiction over the project and the permits required was to be summarized, as well as the public's interest and their comments.

13. Public Workshops

Public workshops provided the public with an opportunity to participate in the planning process. Two workshops were to be held and newsletters were to be sent to keep the public informed.

14. Delta Flood Protection Act

The requirements of the Delta Flood Protection Act were to be reviewed, since the Act may provide an additional source of funding for proposed improvements in Franks Tract SRA.

II. SITE CONDITIONS

A. HYDROGRAPHIC SURVEYS

Bathymetric data from Towill, Inc. (July, 1990) are available for Franks Tract State Recreation Area. Plate 1 is a 1" = 1000' scale hydrographic survey of Franks Tract; Plates 2 through 4 are 1" = 200' scale surveys for Piper Slough and levee. Data are presented using the National Geodetic Vertical Datum (NGVD). Bottom elevations within most of Franks Tract is about -7 to -8 feet NGVD. Shallower areas near the levees are located at the southwest and northwest corners (including Mandy's Island) of Franks Tract and at a number of locations on the west side of the Tract. These locations contain scattered submerged sand mounds.

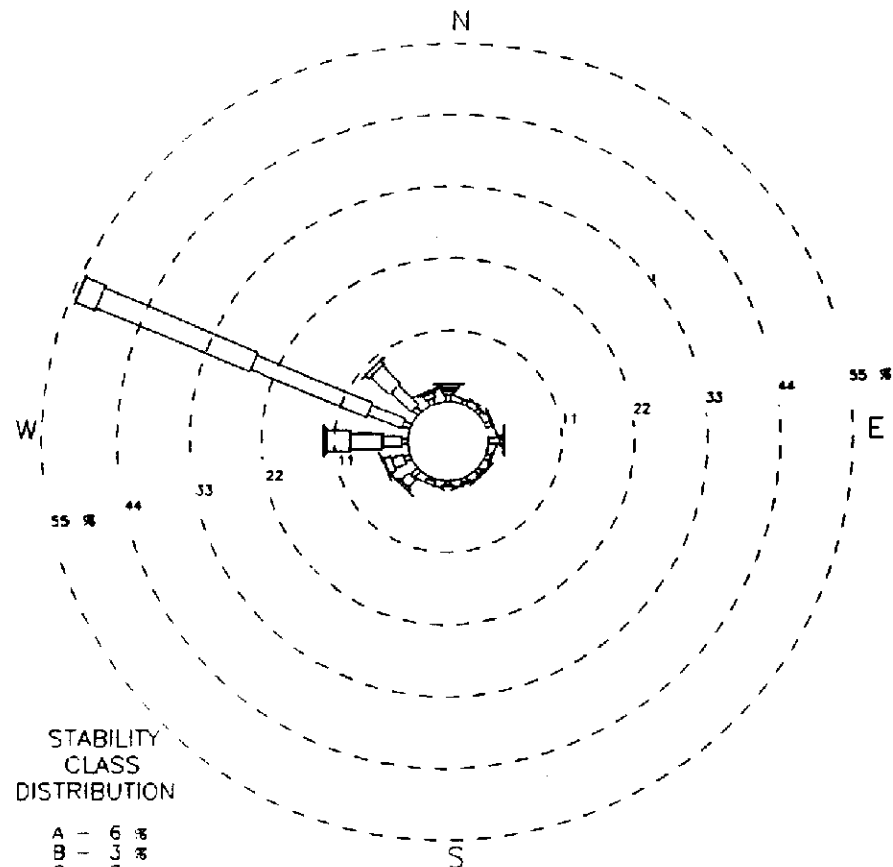
B. WIND, WATER LEVELS AND WAVE CLIMATE

1. Wind

Wind conditions at Franks Tract are best represented by data collected at Bethel Island. Quality-controlled wind data collected by the Bay Area Air Quality Management District (BAAQMD) gives a 3-year data set for prevailing wind conditions. During the spring, summer and fall, winds are out of the west through northwest directions about 70 percent of the time with an average speed of about 10 mph. During the winter, storms produce infrequent but high wind speeds from the north and southeast directions. The 1-minute average

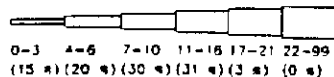
wind speed with a return period of 50 years is estimated to be 55 mph. Wind roses for summer and winter are shown on Figures 1 and 2. Detailed discussion of wind data is available in the report, "Wind and Wave Patterns," (Moffatt & Nichol, Engineers, 1990).

BETHEL ISLAND SUMMER WIND ROSE (JUN-AUG) 1989



STABILITY CLASS DISTRIBUTION

A - 6 %
 B - 3 %
 C - 7 %
 D - 61 %
 E - 10 %
 F - 12 %



WIND SPEED SCALE (KNOTS)

The average wind speed is: 8.6 kts.

NOTE - WIND DIRECTION IS THE DIRECTION WIND IS BLOWING FROM

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

616.400 UTME

4207.400 UTMN

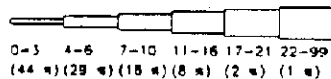
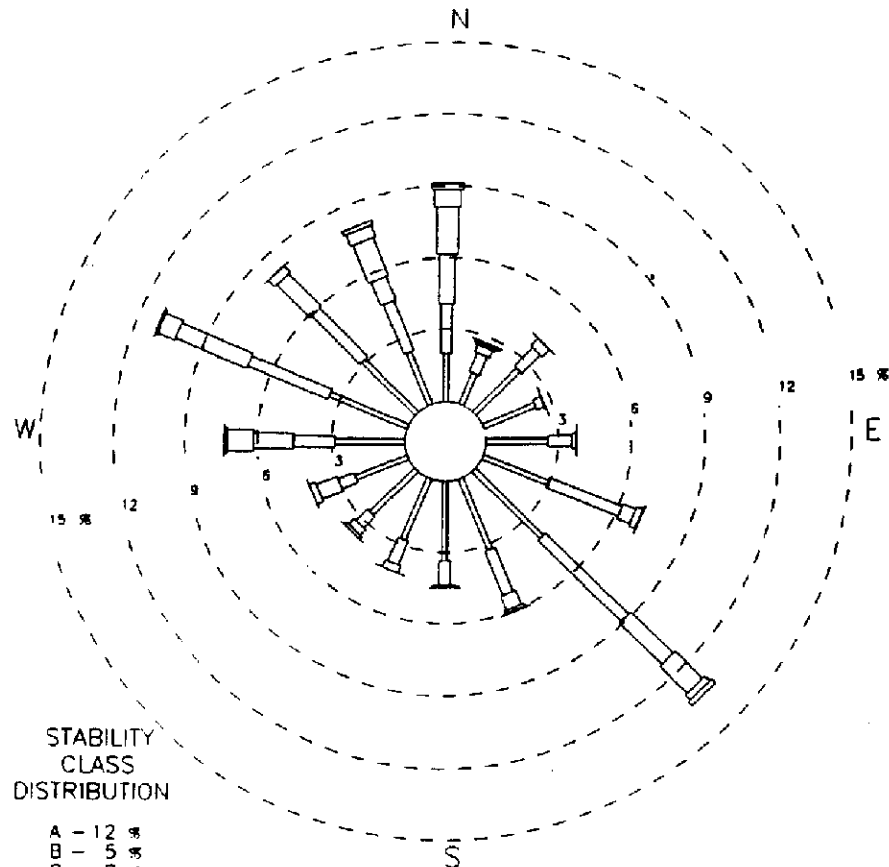
-1.5 m ASL

10 m AGL

M OFFATT & NICHOL, ENGINEERS
 WALNUT CREEK, CALIFORNIA

FIGURE 1

BETHEL ISLAND WINTER WIND ROSE (Dec 88-FEB 1989)



WIND SPEED SCALE (KNOTS);

The average wind speed is: 5.4 kts.

NOTE - WIND DIRECTION IS THE DIRECTION WIND IS BLOWING FROM

BAY AREA AIR QUALITY
MANAGEMENT DISTRICT

616.400 UTME

4207.400 UTMN

-1.5 m ASL

10 m AGL

**M. OFFATT &
NICHOL ENGINEERS**
WALNUT CREEK, CALIFORNIA

FIGURE 2

2. Water Levels

Water levels in the Franks Tract area are influenced by tides, winds, surface runoff and river flows. The water levels at the site are tide-dominated. Tidal datum information is presented in Table 1, based upon a Franks Tract Tidal Benchmark Sheet (NOS, 1950) and tidal benchmark sheets from nearby locations at Dutch Slough, False River, Jersey Island and Prisoner's Point, San Joaquin River (NOS, personal communication, July 1990). The reference plane is Mean Lower Low Water (MLLW) which is about 0.4 feet above the National Geodetic Vertical Datum (NGVD) reference plane.

TABLE 1
TIDAL DATUM INFORMATION

Tidal Plane	Feet Above
MLLW	
Estimated Highest Water Level	+6.5
Mean Higher High Water	+3.4
Mean High Water	+2.9
Mean Tide Level	+1.7
Mean Low Water	+0.5
Mean Lower Low Water	+0.0
Estimated Lowest Water Level	-2.0

A tide gauge was installed in Franks Tract SRA. It is located near Station 40, on the Piper Slough levee. The gauge is mounted on an existing pile and set for elevations based on NGVD.

The U.S. Army Corps of Engineers, Sacramento District has done a stage frequency analysis of the Sacramento-San Joaquin Delta area (1976). Return period water

level results, for the project site, are presented below in Table 2. The numbers are accurate to approximately 0.2 foot (Herb Hereth, Corps of Engineers, personal communication).

TABLE 2
STAGE-FREQUENCY DATA

Return Period (Years)	Water Level (Feet; NGVD)
50	+6.7
100	+7.0

3. Wave Climate

Wind-wave generation analyses were undertaken to assess wave conditions in Franks Tract for both prevailing and extreme wind conditions. Wave conditions were calculated at a number of potential project locations around Franks Tract as shown in Figure 3. Under prevailing conditions during the spring, summer and fall, significant wave heights are about 0.5 feet at the levees along Sandmound Slough and Old River.

Wind-wave generation analysis for extreme wind conditions was based upon the 50-year return period wind event and a Still Water Level of +7.0 feet NGVD. Wind direction is defined as the direction the wind is coming from; H_s is the significant wave height, maximum wave height would be about 65 percent greater than H_s ; T_p is the peak wave period. Results are presented in Table 3 for the 9 locations shown in Figure 3. Further discussion of wave conditions can be found in the report "Wind and Wave Patterns" (Moffatt & Nichol, Engineers, 1990).

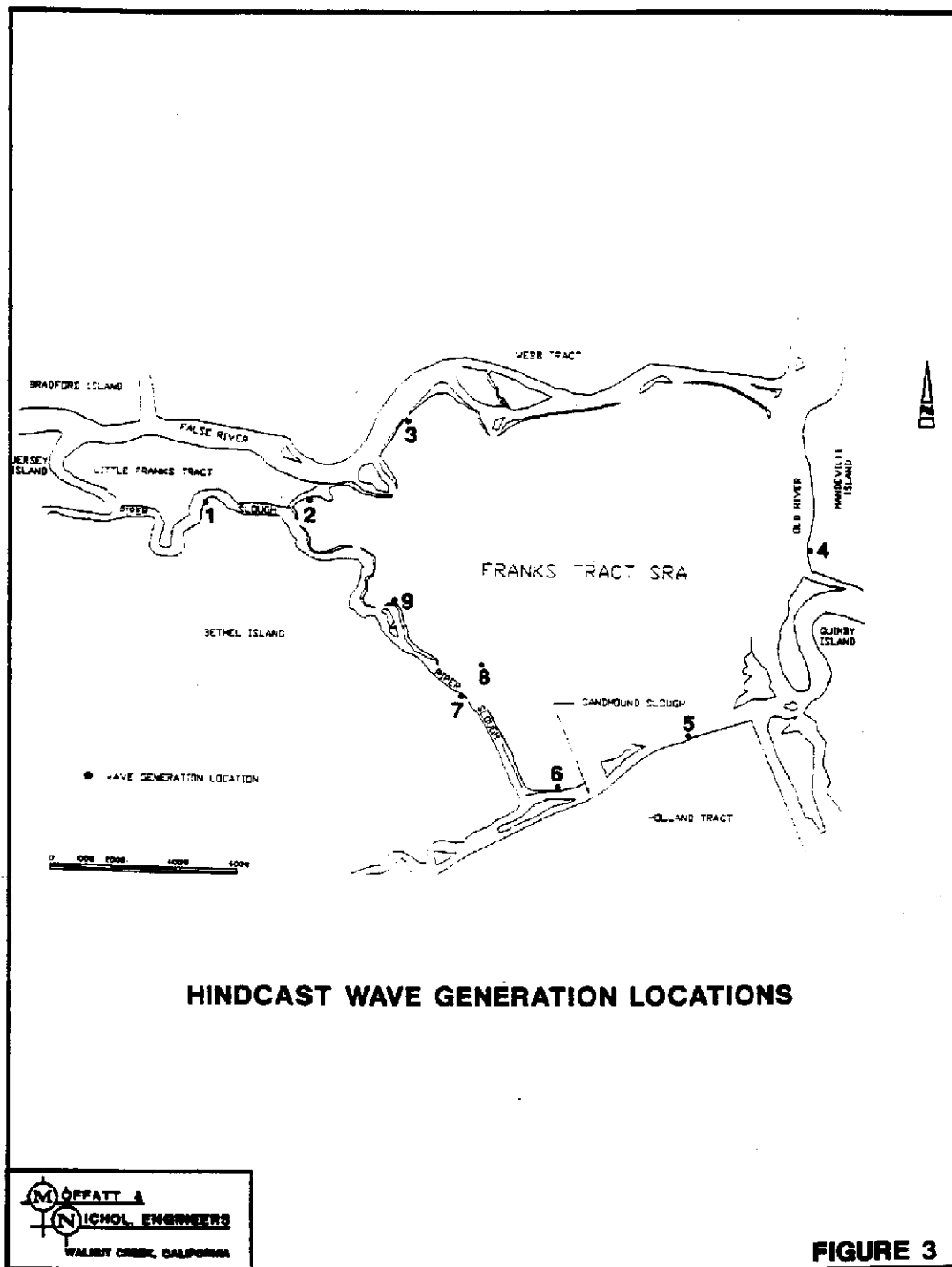


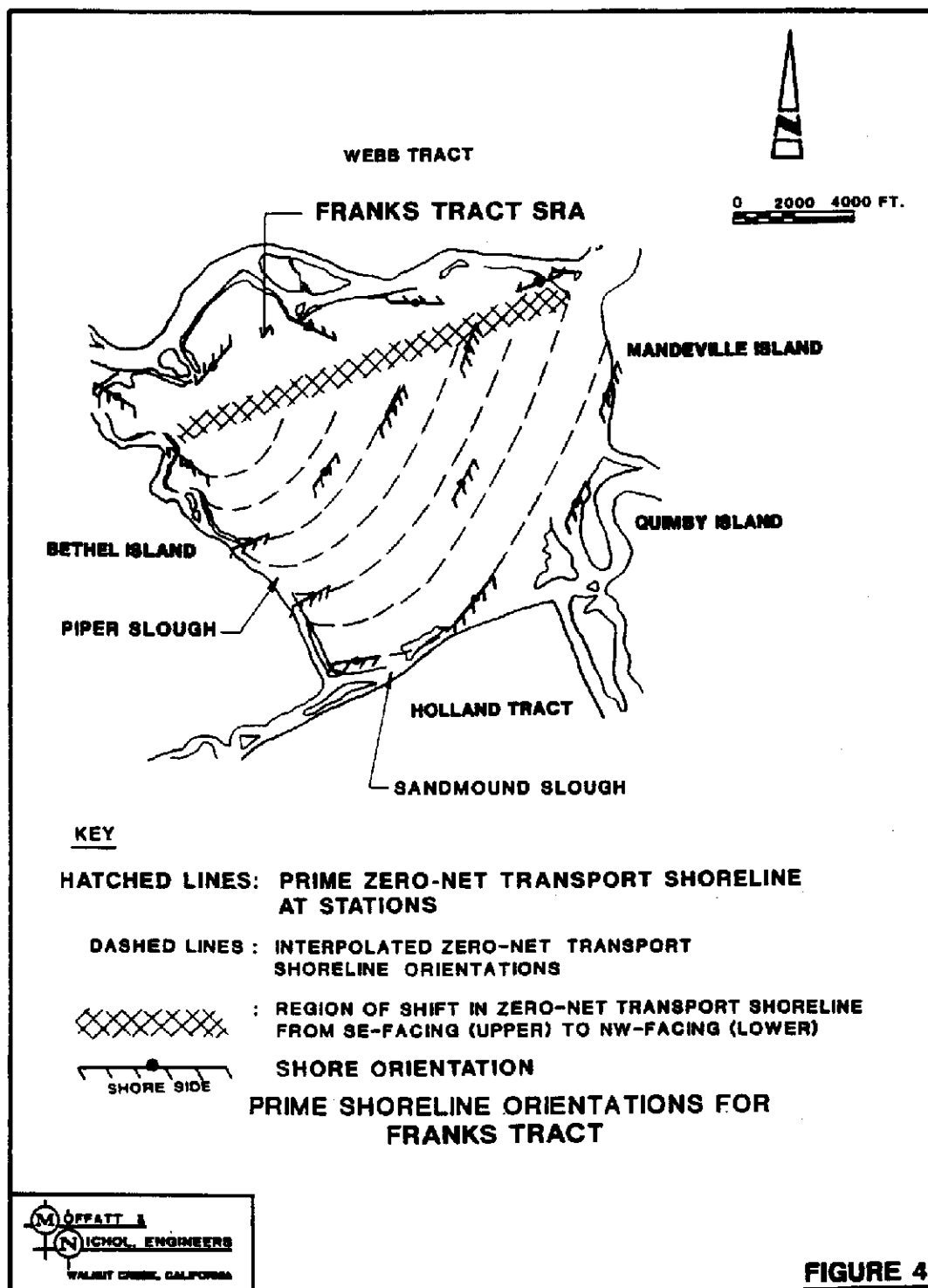
TABLE 3
EXTREME WAVE CONDITIONS

Location	Wind Direction	H _s (ft)	T _p (sec)
1	N	1.8	2.0
	NW	2.2	2.3
2	SE	2.7	2.9
3	SE	3.0	2.9
4	NW	2.2	2.6
5	N	2.9	2.9
	NW	2.9	2.9
6	N	3.0	2.9
7	N	2.7	2.6
	NE	3.0	2.9
8	NW	2.4	2.6
	SE	2.1	2.3
9	N	1.7	2.0
	SE	2.3	2.6

C. SEDIMENT TRANSPORT

Potential longshore sediment transport varies greatly depending on location within Franks Tract. Controls on longshore, or shore-parallel, transport include exposure to the various directions of wave approach and shoreline orientation. The potential annual net longshore sediment transport rate, Q_n , is the difference between the quantity of sand that would move left and right past a shore-normal line in a year's time. The prime shoreline is the imaginary shoreline that would be exposed to the most wave energy, but oriented so that $Q_n = 0$. In most locations within Franks Tract (except the northwest) the prime zero-net shoreline orientation is north-northeast, or normal to the predominant direction of wave approach (See Figure 4). The gross longshore transport rate, Q_g , is the quantity of sand that will move past a shore-normal line in a year's time. Transport to the left and right are both considered, and are additive. The potential annual gross longshore transport

rate, Q_g , increases 30-fold from northwest to southeast
within Franks Tract along



the prime shoreline or respectively, from 750 yd³/yr to 22,500 yd³/yr (See Figure 3).

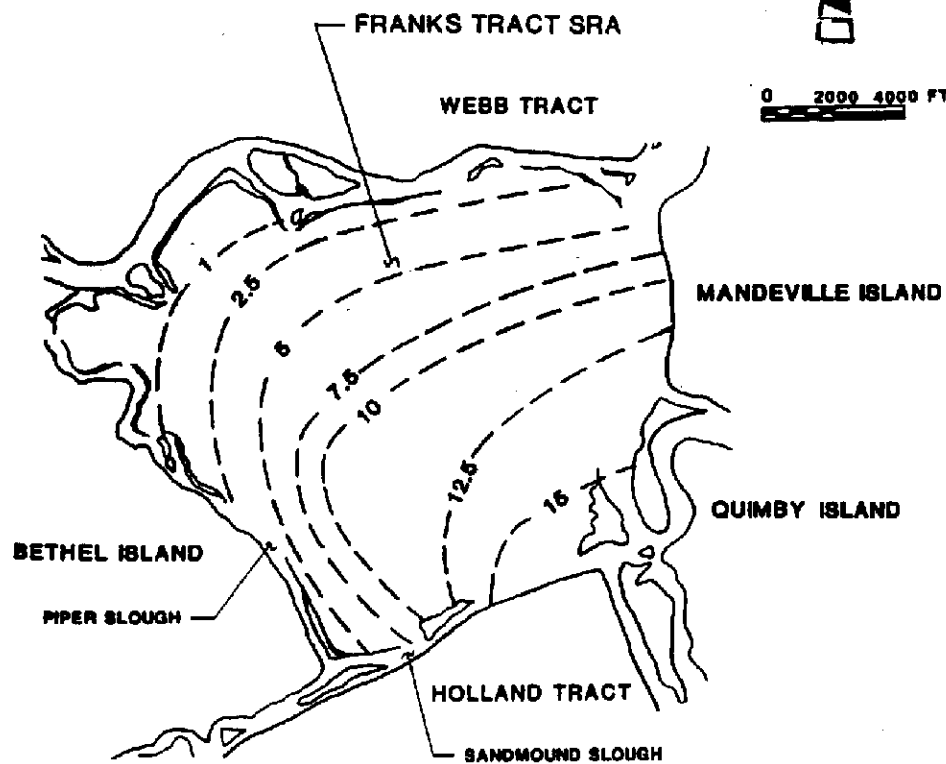
Net and gross potential transport rates also vary greatly along the levee perimeter of Franks Tract. Net transport along the west (Piper Slough) and the north perimeter is 10 to 20 percent of the net transport along the east (Old River) and south (Sandmound Slough) sides of the tract (See Figure 6).

The beach and shoreface slope is a critical parameter because the volume of sediment needed to build a beach or island is dependent upon the dynamic equilibrium slope that will result from cross-shore, wave-induced transport after construction. Beaches above mean water level will have slopes that average about 1v to 8h. Below mean water level, slopes will average about 1v to 45h. The submerged construction profile should be steeper than this to allow for a small amount of offshore transport during equilibration. Onshore transport may not occur on a milder construction profile.

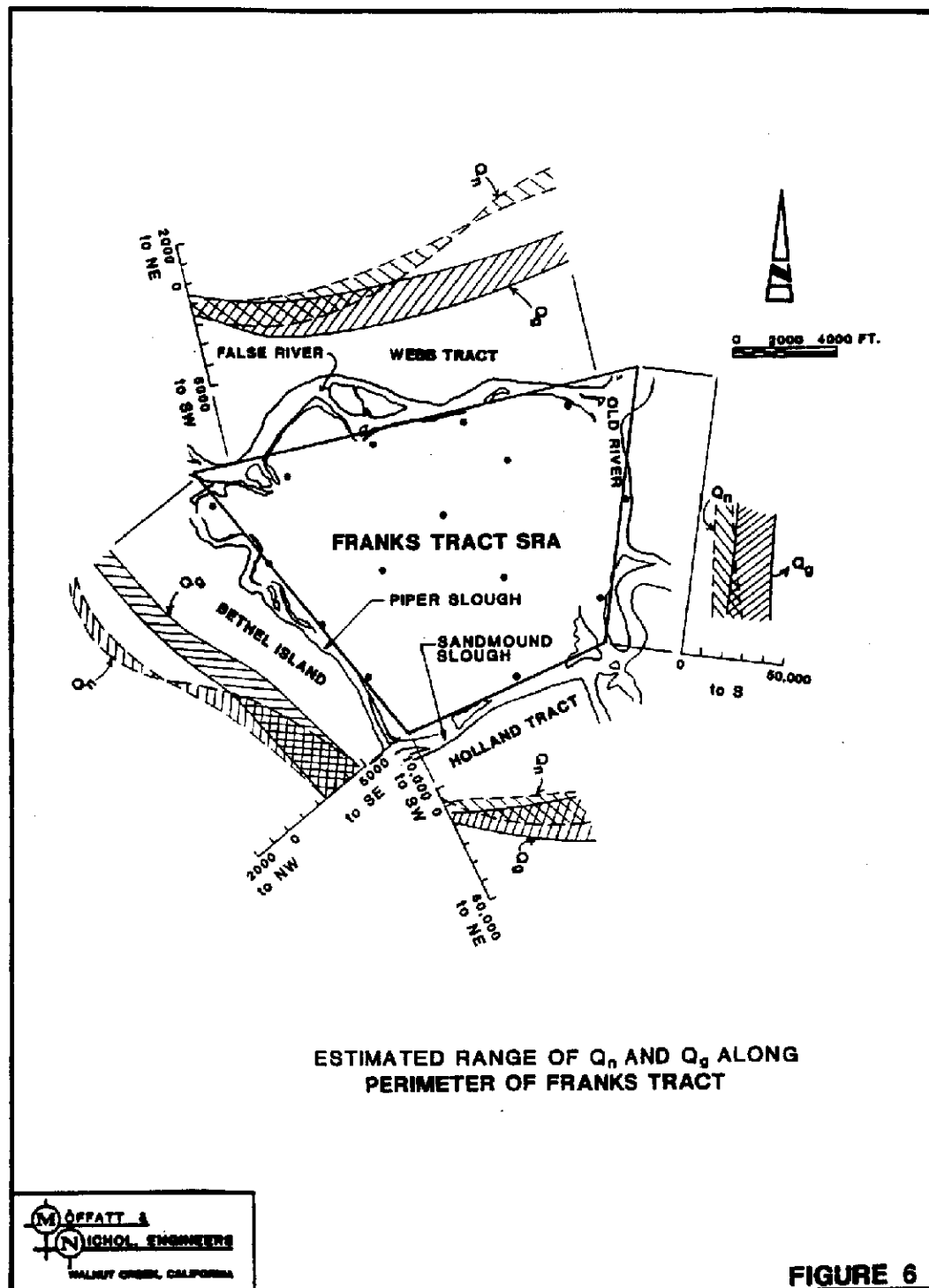
Sandy beaches will be subject to aeolian, or wind-induced, erosion when a critical wind velocity of about 13 mph is exceeded. This will occur a maximum 20 percent of the time for beaches exposed to winds approaching from west to north. Narrow south and east-facing beaches will be shielded from most erosive winds. Surface creep and saltation, the predominant modes of transport, will increase to a maximum on a dry surface width of 200 feet or wider. For a wide beach, the estimated maximum annual discharge rate for a nearly horizontal, smooth, dry, unvegetated surface will be 8 to 9 yd³/ft-yr. Wind-induced erosion and transport on a narrower beach that is wet some of the time will be significantly less. Trapping by tall, closely-spaced

obstructions such as tule stalks, and encroachment in depressions such as the lee side of a ridge, can be used to reduce or eliminate wind-borne sand discharge.

Figure 5



**RELATIVE Q_g VALUES FOR PRIME ZERO-NET TRANSPORT
SHORE ORIENTATIONS IN FRANKS TRACT**



Further discussions on sediment transport in Franks Tract can be found in the report "Sediment Transport Analysis" (Moffatt & Nichol, Engineers, 1990).

D. GEOTECHNICAL

Geotechnical investigation was conducted by Harding Lawson Associates for Franks Tract SRA. Borings were taken at 18 locations within Franks Tract; Figure 7 shows the approximate locations. Typically, the subsurface soils include soft organic silt and fibrous peat soils underlain by a dense, fine, silty sand unit. A profile along Piper Slough levee is shown in Figure 8.

The peat layer thicknesses varies up to 25 feet in Franks Tract SRA.

In the south and west parts of Franks Tract, the peat and organic silt are generally less than 15 feet in thickness. The peat deposits become thicker on the northwestern part of Franks Tract.

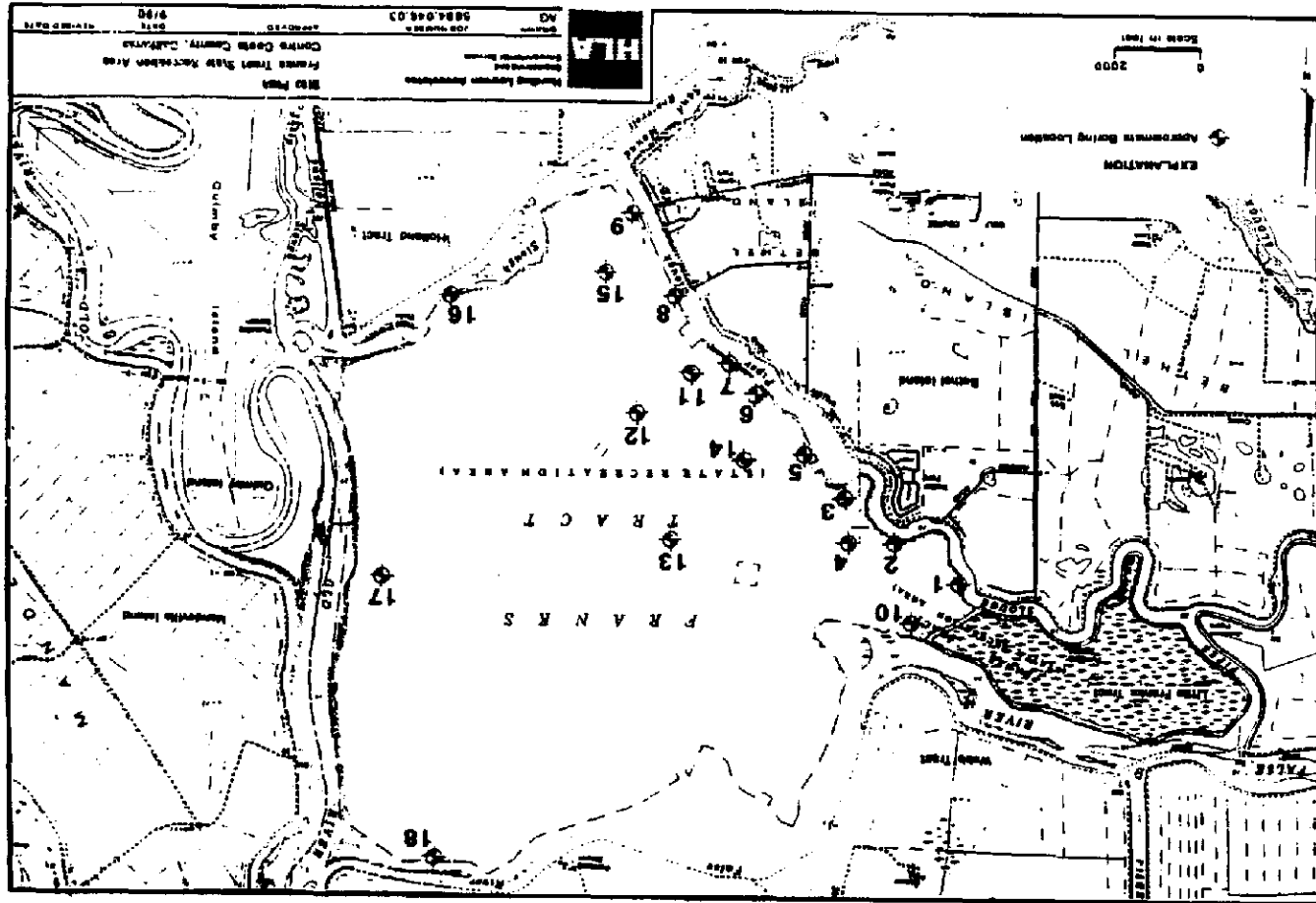
Review of aerial photographs taken prior to flooding of the tract revealed that remnant sand dune deposits existed at various locations in the southwestern portion of Franks Tract. Four borings were sited to evaluate the consistency and variability of these deposits. Silty sands were encountered at each of these locations, confirming the presence of sand dunes.

The fibrous peat deposits are very soft and weak. The average total unit weight is approximately 65 pounds per cubic foot (pcf). The submerged peat therefore applies a very low effective stress on the soils below.

The silty sand unit underlying the peat was medium dense to

very dense, except for the top few feet of sand underlying the peat, which was generally loose. This loose sand was essentially unconfined because of the very low effective stress imposed by the submerged peat above. With increasing depth, the sand becomes dense. Detailed discussion of the

Figure 7



1-004786

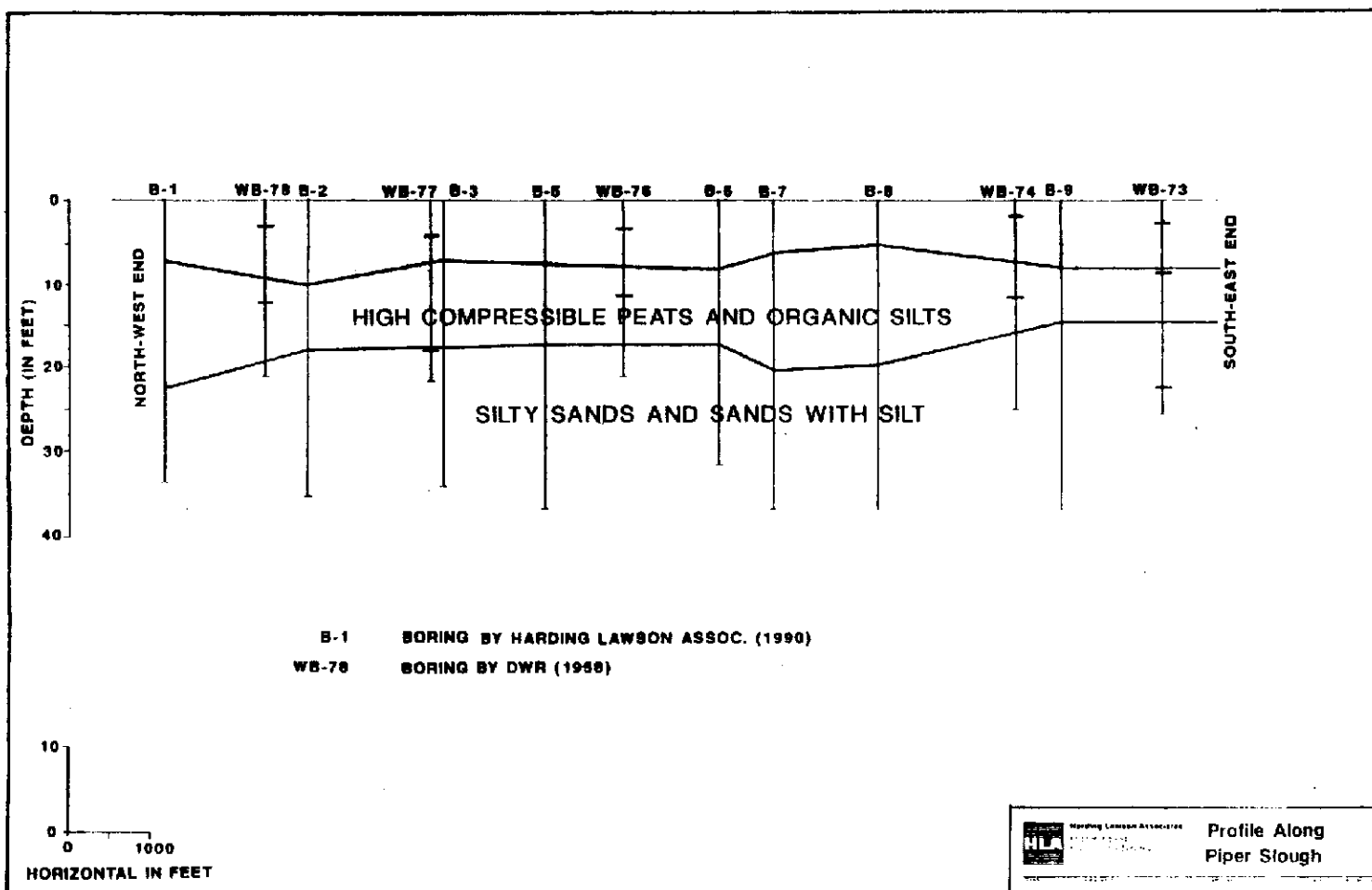


FIGURE 8

1-004786

subsurface soil conditions can be found in the report, "Geotechnical Investigation," (Harding Lawson Associates, 1990).

Sediment chemical analyses were completed on four surface soil samples. The samples were taken at the corresponding soil boring locations shown in Figure 7. The sediment analyses did not indicate high levels of materials that would be considered hazardous. Testing for the metals was compared to threshold limits described in the California Administrative Code, Title 22. Results indicated that all samples were well below the Total Threshold Limit Concentration (TTLC) for the metals tested. However, the samples contain some metals that are above the Soluble Threshold Limit Concentration (STLC), which may be of concern. Below is a summary of each sample with the metals that were above the STLC. Concentrations that are less than 10 percent above the STLC are indicated with an asterisk.

TABLE 5
SUMMARY OF TESTING FOR METALS

Sample	Metals Above STLC
B-5	Mercury, Selenium
B-7	Arsenic, Barium*, Mercury, Nickel, Lead, Selenium, Thallium, Vanadium
B-12	Mercury, Lead, Selenium,
Thallium	
B-18	Arsenic, Mercury, Nickel, Lead, Selenium, Thallium

Further analyses of the samples using a solubility detection

method may be necessary. The standard Title 22 method, using weak acid designed for landfill applications, may not apply. The requirements for any further testing should be developed in consultation with the resource agencies responsible for management of potentially hazardous materials.

E. NON-ENGINEERING CRITERIA

Franks Tract SRA and surrounding waterways provide for a range of boating activities including waterskiing, fishing and waterfowl hunting. The False and Old Rivers are relatively heavily travelled waterways used by boaters going towards the islands south of Franks Tract. Piper Slough experiences congested traffic due to the many marinas along the Slough. The Piper Slough/Sandmound Slough Confluence is a favored waterskiing spot. Recreational boaters and waterfowl hunters use the open waters of Franks Tract, however, usage is restricted due to choppy wave conditions and navigation hazards.

Fishing areas at Franks Tract SRA are at the southern end of the tract and also the northwest area of the tract, near the openings in the levee between Franks Tract and False River.

In the Master Plan for Franks Tract State Recreation Area, a key goal is the restoration and protection of the wildlife habitat resources. In the Sacramento-San Joaquin River Delta an important habitat that is almost completely absent is the shallow water-intertidal ecosystem. This type of habitat was largely lost when the Delta islands were leveled and drained. Practically all of Franks Tract and Little Franks Tract is in the subtidal zone and is too deeply flooded to provide this type of habitat. Thus, the proposed construction of low islands in the subtidal area has the

potential for the recreation of the shallow water-intertidal habitat that is in very short supply. The construction of these islands would be compatible with the other major goal, providing additional recreational opportunities. A detailed discussion of the wildlife habitat resources, and the recreational, fishing and hunting activities that take place in Franks Tract SRA is presented in the report, "Franks Tract - Non-Engineering Criteria," (Wendell Miller and Moffatt & Nichol, Engineers, 1990).

III. DESIGN CRITERIA

A. ISLAND MATERIAL SOURCES

Relic sand mounds in Franks Tract are ideal sources of fill for island construction. Figure 9 shows areas where surficial sand deposits were found. The sand typically has a mean size of 0.22 mm and a silt/clay content varying from 4% to 20%. In general, however, the sand unit is overlain by soft organic soils, which complicates the removal of the sand. This overburden must be stripped and disposed of. The weak soils are unsuitable for island construction except as a soil amendment in relatively small amounts to stimulate plant growth. Furthermore, the removal of the relatively impermeable soft soils could increase seepage into the sand unit, with a resulting increase in seepage on adjacent islands.

The report by Harding Lawson Associates (1990) discusses the impacts of increased seepage. These impacts can be minimized by placing new borrow areas at significant distances from neighboring islands or tracts, thereby increasing the head loss for waters entering the sand aquifer at the borrow areas. Borrow areas should be located at least 400 feet from the toe of existing or planned islands or remnant levees. Additionally, borrow areas should be located at least 2,000 feet from the nearest flood protection levee for an adjacent island or tract. Therefore, the removal of sand in Piper Slough near Sandmound Slough was not evaluated.

An investigation of potential off-site sources of fill for island construction identified several possible sites. However, the cost of such fill after paying royalties to site owners, loading it on barges and transporting it to

Franks Tract is significantly greater than the cost of on-site material.

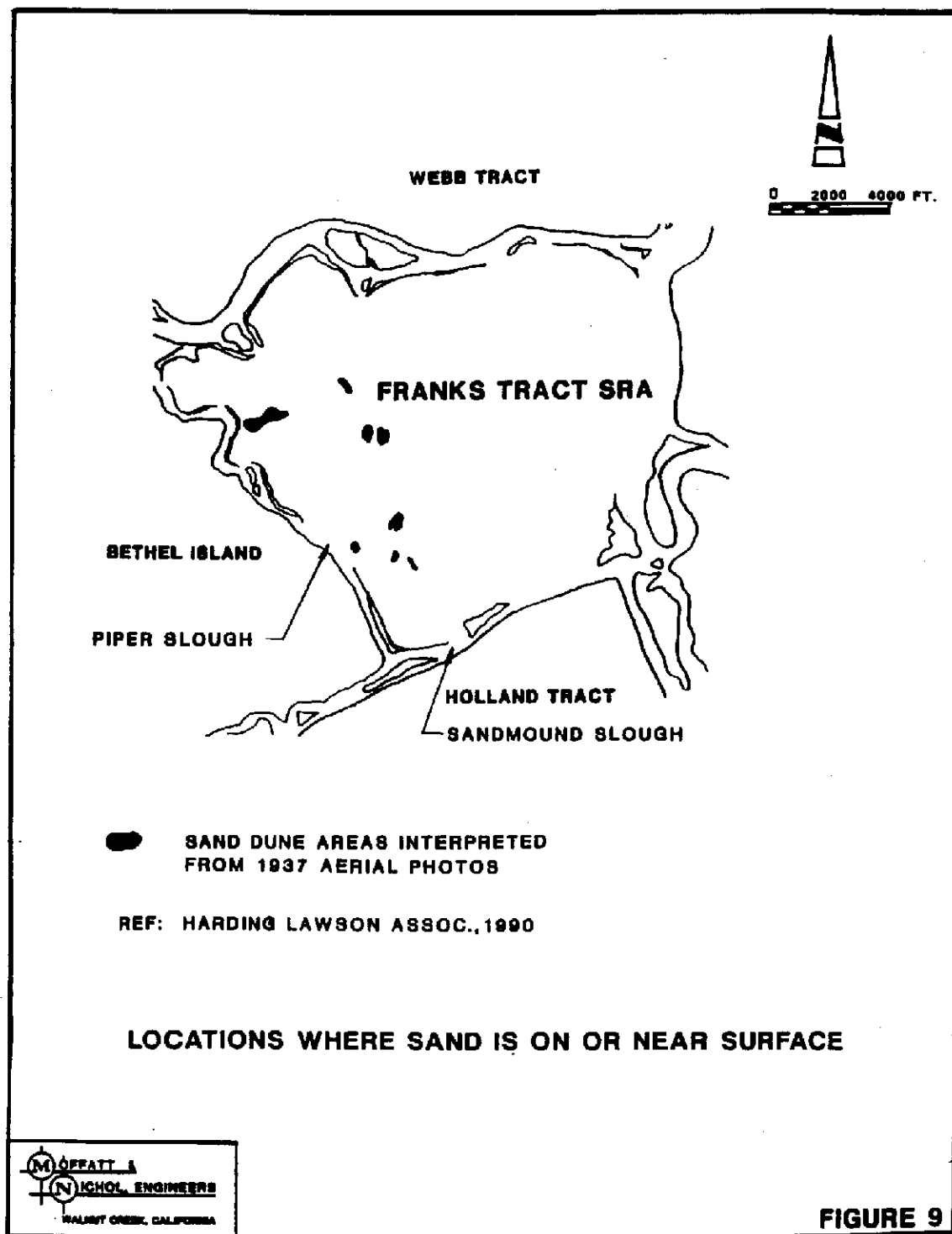


FIGURE 9

B. ISLAND MATERIAL PLACEMENT

The soft peat and organic silt found within much of the submerged area of Franks Tract are highly compressible materials that consolidate under applied loads. Initial settlements are high relative to other soils and subsequent settlements are of moderate term duration. Time rates of settlement for thicknesses of compressible peat deposits are shown in Figure 10. Additional fill material is needed to achieve the design elevation due to the consolidation of the peat material.

Fill material should be placed in stages or lifts. The report by Harding Lawson Associates (1990) recommends lifts of no more than 6 feet below the low water level and 3 feet of height above the water. Sufficient time should be allowed between lifts for the underlying peat to consolidate or gain strength. It is estimated that adequate strength gain can occur within three months at which time the next load increment can be placed. Consolidation also results in island subsidence, which can approach 1/2 the initial thickness of the soft soil unit, and substantially increase the total volume of fill required to maintain design grades. The fill must be replenished with additional lifts to compensate for subsidence.

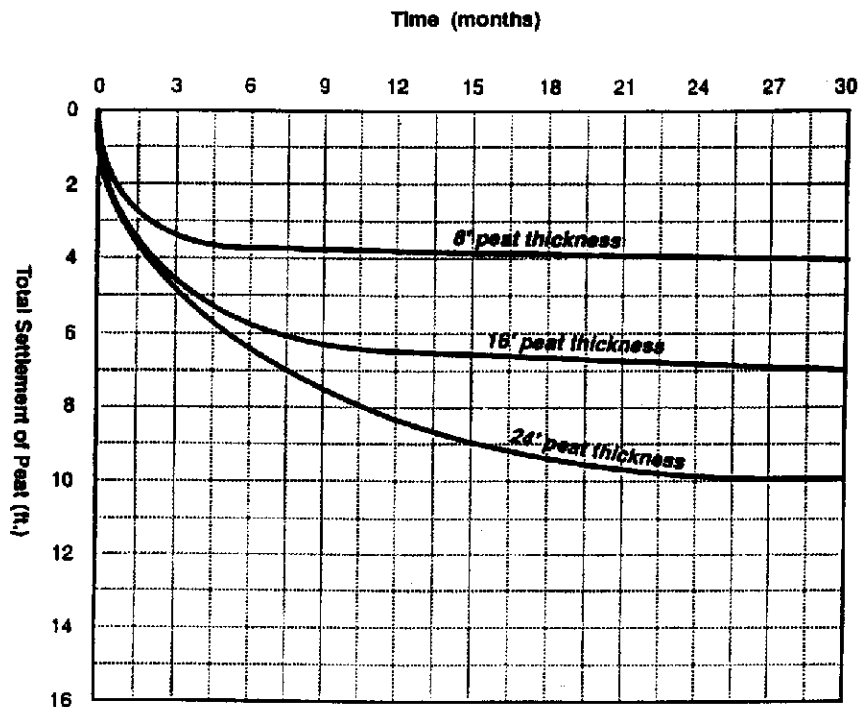
If island fills are placed directly on the sand unit, none of the above concerns arise. Areas where the sand unit lies at the surface are ideal sites for island construction, but they are also the best sites from which to obtain sand fill.

C. MAN-MADE STRUCTURES

Construction and maintenance of man-made islands may be

facilitated if structures are employed to enhance the stability of the island fill material. Many structures were evaluated for applicability at Franks Tract SRA. A detailed review is available in the report "Structures Demonstration Project," (Moffatt & Nichol, Engineers, 1990).

Figure 10



- NOTES: 1. Assumed C_v of 80 ft²/yr.
2. Settlements correspond to a sustained load of 1600 psf.

C_v = COEFFICIENT OF CONSOLIDATION



Harding Lawson Associates
Engineering and
Environmental Services

DRAWN
RHC

JOB NUMBER
5684.047.03

Time Rate of Settlement
Franks Tract State Recreation Area
Contra Costa County, California

APPROVED

DATE
12/90

REVISED DATE

FIGURE 10

Fixed structures, or groins, can be designed to retain a beach fill placed on the Franks Tract side of the levees and reduce fill loss due to longshore transport. Important design considerations for groins include their height, length and the littoral transport rate. Groins should extend out to the limit of longshore transport zone in order to minimize losses around the structure. Height of the groin will determine how much sand will pass over the structure. The groin may be constructed of treated timber, prestressed concrete, or steel sheet piles for economy of construction on the weak foundation soils that exist in the area. Alternatively the groin may be constructed as a rubble mound using quarry stone.

IV. RECOMMENDED DEMONSTRATION PROJECT

A. RECOMMENDATIONS AND SELECTION CRITERIA

This report specifically recommends construction of four demonstration "Island" fills located in the westerly portion of Franks Tract SRA for consideration as highest priority of work to be funded from the four million dollars available from the California Wildlife and Park Conservation Act (Proposition 70). Construction of a section(s) of a wall along Piper Slough is feasible and is recommended for consideration as next priority work if additional funds or credits for mitigation enhancement become available. The following key criteria were established to measure feasibility of the alternative demonstration projects evaluated:

1. Provides recreation benefits
2. Provides wetland habitat benefits
3. Provides secondary wave protection for Bethel Island levees.

Additional criteria considered during the evaluation of the alternatives were:

1. Cost of project(s) proposed within available funding
2. Engineering factors are such that the project(s) have a reasonable chance of success.
3. Environmental approval of selected project(s) obtainable in a reasonable period of time.
4. Project(s) minimize maintenance and operation costs
5. Project(s) minimize liability and safety issues
6. Project(s) may be eligible for wetland habitat

enhancement credits under Delta Flood Protection Act (S.B. 34).

The amount of weight given to the secondary wave protection criteria for Bethel Island levees was not completely resolved during the public meetings and discussions between local Bethel Island residents and State Agencies technical and Operations staff.

Construction of a small section of demonstration walls within available funding may be appropriate to evaluate wave reduction effectiveness. This would require a reduction in island fill sizes and agreement on priority given its main emphasis on wave protection for Bethel Island levees.

B. PROJECT DESCRIPTION

The proposed demonstration project consists of four separate island fills located in the westerly portion of Franks Tract as shown on Figure 11. Islands I, II and III are placed in coves on the Franks Tract side of the Piper Slough levee. A single groin is proposed at the southerly limit of Island III to help retain the beach fill. Island IV is placed in the area south of Mandy's Island. Figures 12, 13 and 14 show the plan of each island project.

Design of Islands I and II maximizes the conversion of subtidal areas to shallow water habitat areas. A typical cross-section is shown in Figure 15. The crest, or top, elevation is at +4' NGVD to maximize the area developed within the limits for shallow water habitat.

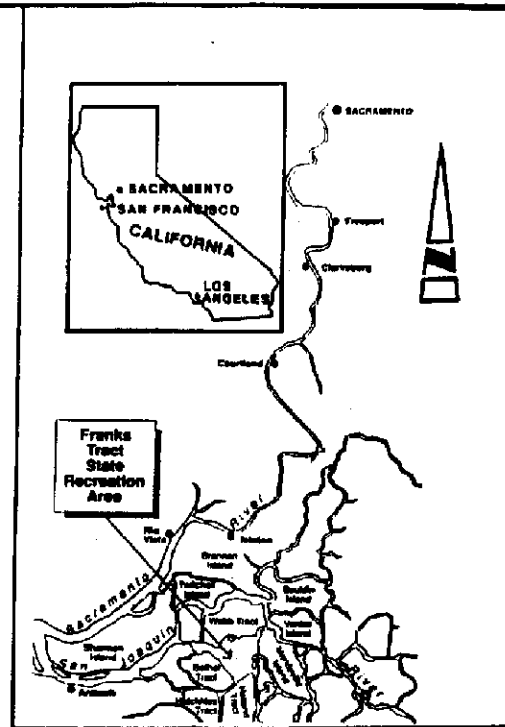
Islands III and IV maximizes the conversion of subtidal areas for recreational benefits. The crest elevation of the

fill will be -6' NGVD as shown in Figure 15.

Materials for the island fills will be taken from relic sand mounds located in the central portion of Franks Tract. A total of about 1 million cubic yards of material in-place is estimated for construction of the island fills. Material will be removed by hydraulic dredge and placed in a series of lifts. Placement of the material will be controlled to minimize impacts on existing wetlands vegetation in the area, and on water quality. Control will also be necessary to help

Figure 11

STATE OF CALIFORNIA
DEPARTMENT OF PARKS & RECREATION



VICINITY MAP
NTS

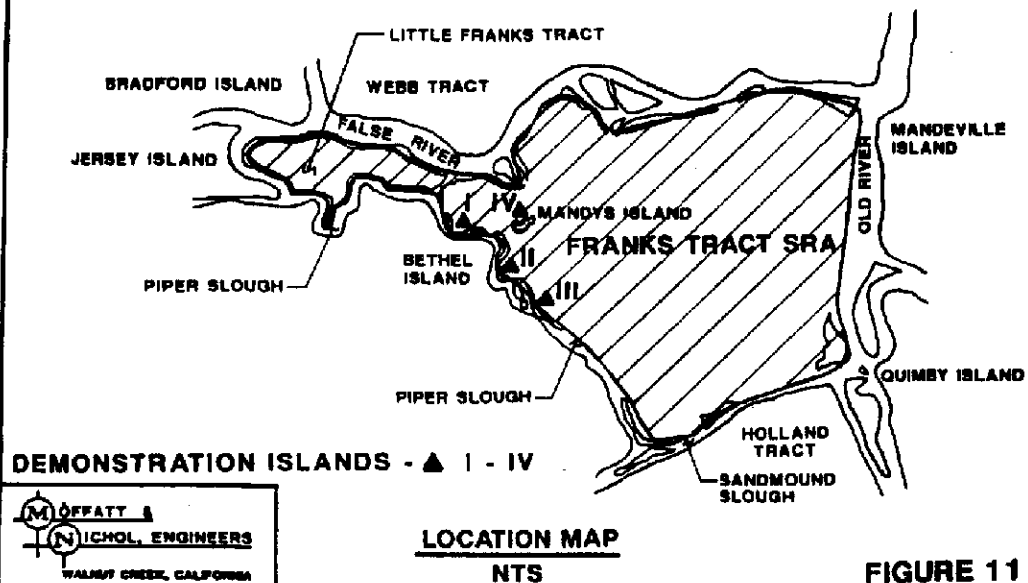
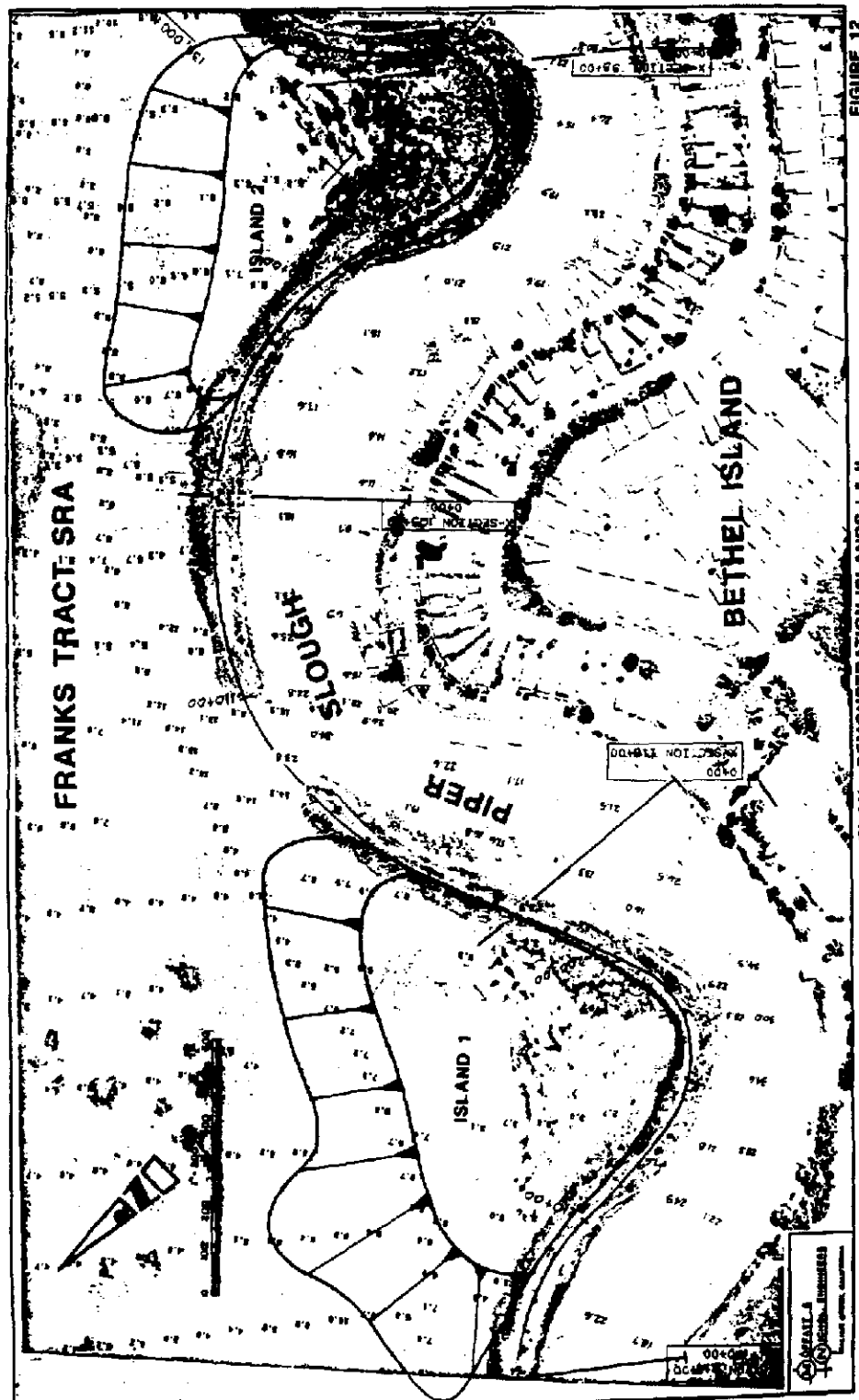


FIGURE 11

PROJECT LOCATION

I - 0 0 4 8 0 0

I-004800



PLAN • DEMONSTRATION ISLANDS I & II

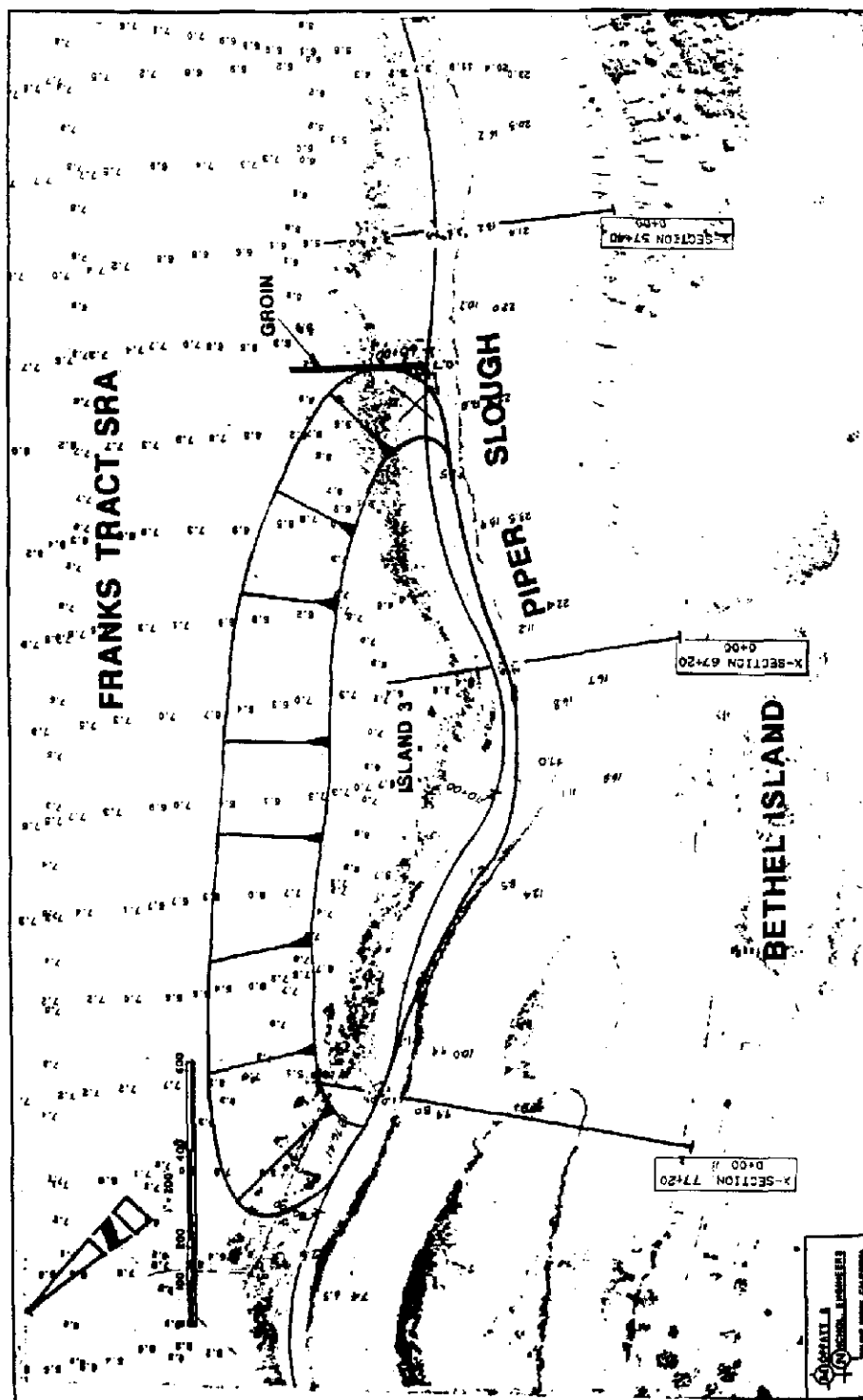
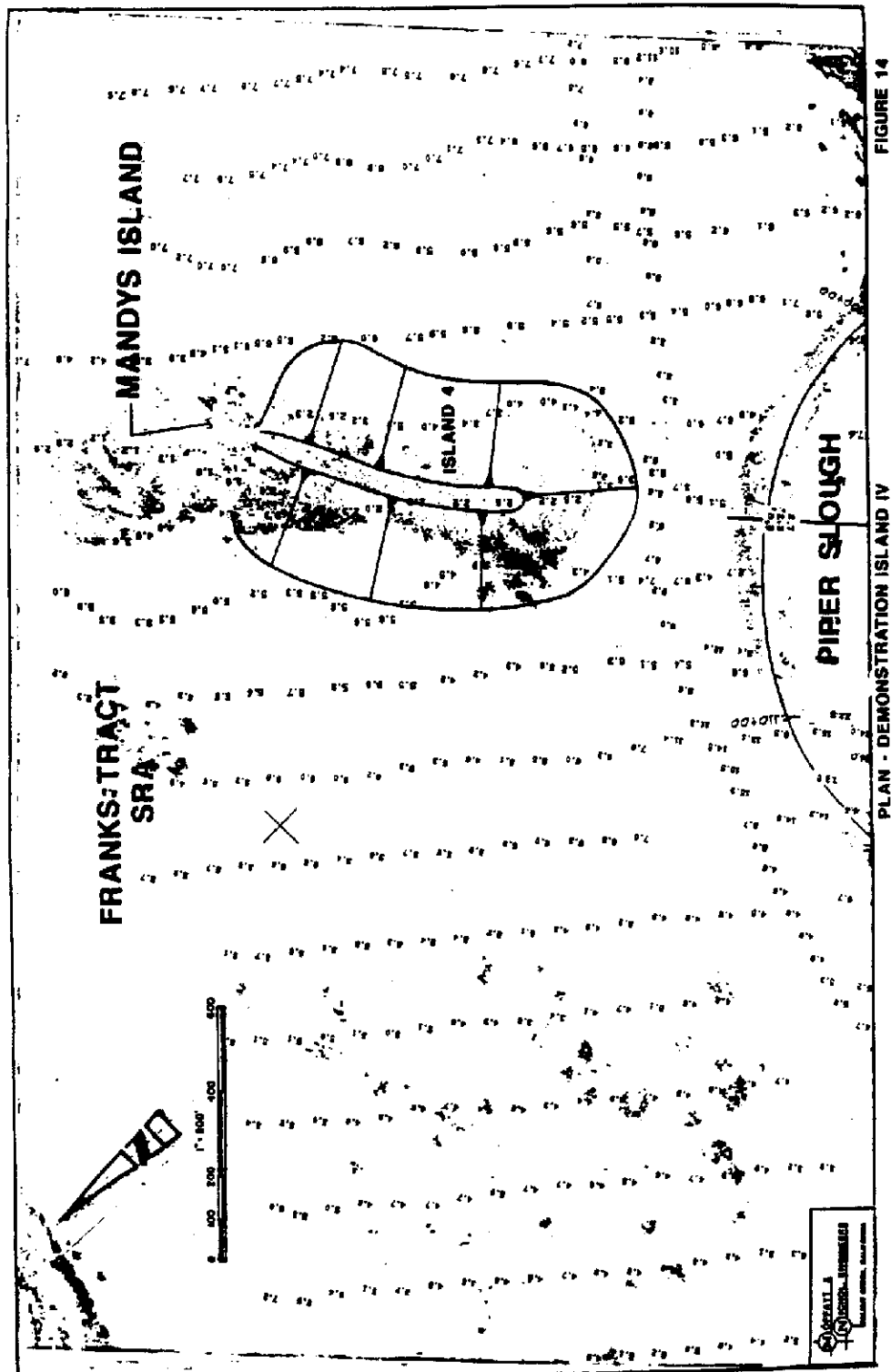
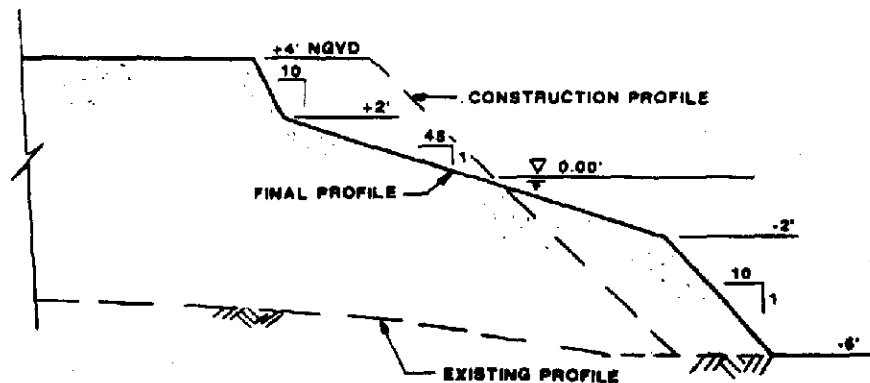


FIGURE 13

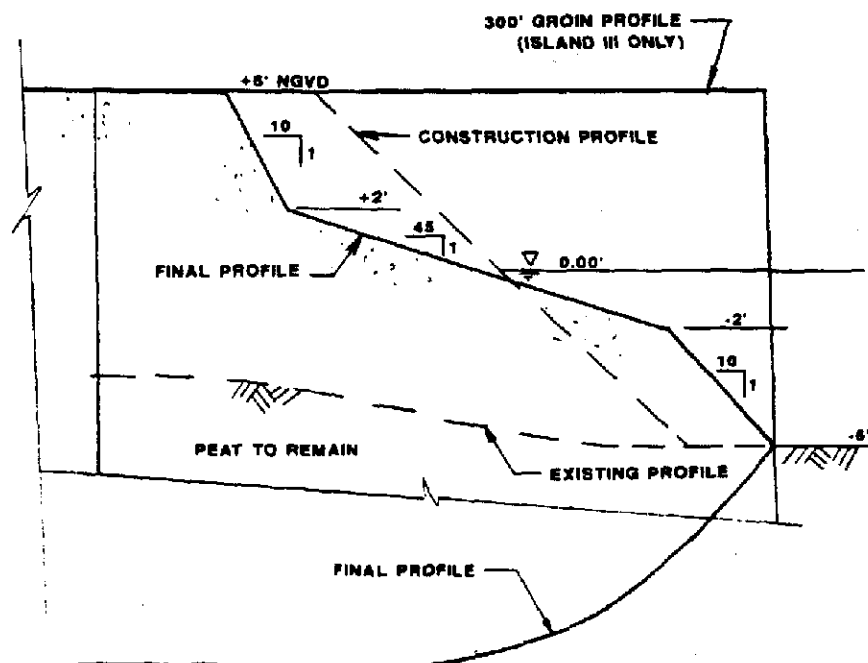
PLAN - DEMONSTRATION ISLAND III



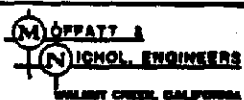


HABITAT AREA

NOTE: SAND PLACED ON EXISTING BOTTOM. NO REMOVAL OF PEAT.



RECREATION AREA



TYPICAL SECTIONS

FIGURE 15

insure stability of the remnant levee against which the fills will be placed, and proper blending of the fill with soft organic soils for vigorous plant growth.

Vegetation should propagate naturally on the islands in the shallow water areas; seeding and planting are proposed for the riparian areas. During the period of plant establishment, passive use of the recreational beaches can be permitted. As the vegetation matures, more intensive use may be permitted, including boat-in picnicking and camping.

As a demonstration project, monitoring should be performed following construction. Monitoring will determine the extent to which the anticipated project benefits have been realized, including wetlands creation and recreational utilization. Programs should include but not limited to monitoring of borrow site seepage, fill settlement/consolidation, vegetation establishment.

C. COST ESTIMATE

The estimated cost of the proposed Demonstration project is \$3.6 million. Table 6 presents a summary of the preliminary cost estimate. This cost is based on 1991 construction dollars, and includes overfill for subsidence and an allowance of 10% for losses of material during construction.

It was assumed that an 8-inch dredge would be used and that the contractor would move out and back in between lifts. Project administration and engineering fees and an allowance for monitoring programs is included in the project cost estimate.

TABLE 6
BEACH FILLS
PRELIMINARY PROJECT COST ESTIMATE
(JANUARY 1991 \$)

Cost	Item	Quantity	Unit	Unit Cost	
100,000	Mobilization	1	Job	\$100,000	\$
2,908,800	Dredge	969,600	cy	\$3	
	Move Out/In	3	Moves	\$ 25,000	75
1,000	Groin	300	lf	\$	
	<u>300,000</u>				
	Subtotal			\$3,383,800	
120,000	Project Administration & Engineering				
	Monitoring Programs			<u>100,000</u>	
	TOTAL PROJECT COST			<u>\$3,603,800</u>	

D. SCHEDULE

Implementation of the proposed demonstration project will require about 30 months. This schedule is based on a fast-track approach, where environmental certification and permit acquisition occur concurrently with final design and construction contract preparation during the first 12 months. Contract construction then follows over a period of about 18 months. This schedule does not include the

monitoring phase of the project, which begins immediately following construction and continues for a period of up to 5 years.

V. ENVIRONMENTAL REVIEW AND PERMIT PROCESS

The Franks Tract SRA Demonstration Project Review Process will involve public, state and local agencies and private groups and individuals. The project must comply with two environmental laws due to the involvement of both federal and state regulatory agencies: the State California Environmental Quality Act (CEQA) and the Federal National Environmental Policy Act (NEPA). A lead agency must be designated to insure compliance with the respective laws. The U.S. Army Corps of Engineers is expected to be the lead NEPA Agency and the California Department of Parks and Recreation will be the lead CEQA Agency. All groups may participate in the review process through this framework.

The National Environmental Policy Act (NEPA) was established in 1970 to require federal agencies to assess the environmental impacts of their proposed policies and actions through the preparation of Environmental Impact Statements (EIS). For NEPA, an Environmental Assessment is prepared to determine the significance of the impacts. If no significant impacts are determined, a Finding of No Significant Impact (FONSI) report is prepared. If significant impacts are determined, an EIS is prepared. California adopted a similar act for environmental protection. The act is called the California Environmental Quality Act (CEQA). It contains statements of legislative intent concerning state agency responsibilities for regulating activities so that consideration is given to preventing

environmental damage. An Initial Study is prepared by the lead agency to determine the significance of impacts for a project. If no significant impacts are determined, a Negative Declaration is prepared. If significant impacts are determined, an Environmental Impact Report (EIR) is prepared.

The jurisdictional limits of NEPA and CEQA are not well-defined.

Projects in California are required to adhere to the CEQA guidelines for environmental impact assessment. For Franks Tract, Federal agencies will also be involved for permitting and review. A determination of federal involvement and the applicability of NEPA guidelines to the Franks Tract project should be made early in the environmental review process. This is necessary to define the scope of the documents that must be prepared. If NEPA guidelines apply, consideration should be given to joint document preparation that satisfies both Federal and State requirements.

The report "Franks Tract SRA - Permits, Priorities and Programs" (Moffatt & Nichol, Engineers, 1990) presents a listing of public and private entities with an interest in the project. The listing is divided into Federal, State and local agencies and public groups and individuals. The report describes the responsible agencies and the permits required, as well as the groups interest in the project and associated issues and comments. Table 7 is a listing of the primary permits required for the proposed project at Franks Tract SRA.

TABLE 7

PERMITS

Federal Agency

State Agency

U.S. Army Corps of Engineers

State Lands Commission

California Regional Water
Quality Control Board

VI. POTENTIAL FUNDING SOURCES

The project funding source is primarily from the Legislative Bond Act. The California Wildlife and Park Conservation Act (Proposition 70) includes up to \$4 million to implement projects consistent with the Franks Tract SRA General Plan. These funds could apply to the proposed demonstration project.

As described in the long-term goals for the Delta Protection Act, projects that incorporate flood protection (wave protection) benefits can be considered eligible for monies from the Special Flood Control Projects program. In "Actions & Priorities, Delta Flood Protection Act" (Department of Water Resources, 1990), those Franks Tract State Recreation Area projects that provide wave protection to neighboring islands have been identified as possible cost-share projects. The demonstration project helps reinforce a portion of the remnant Franks Tract levees on Piper Slough and thereby provides protection for Bethel Island from waves generated on Franks Tract. This long term wave protection benefit is consistent with the Special Projects Program purpose.

Continued communication with Department of Water Resources during environmental review, permit acquisition and final design phases will be needed. Although specific program design criteria do not exist, the projects will be evaluated for funding eligibility on the basis of benefits generated by the specific projects to be implemented at Franks Tract SRA.

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